VACUUM SOLUTIONS

Part of the BUSCH GROUP

TYR PLUS

Rotary Lobe Blowers and Vacuum Pumps
WT 0600-0730 CP PLUS, WT 0600-0730 CV PLUS

Instruction Manual



SERVICE
AND SPARE PARTS, INSTRUCTION MANUALS ...
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1 Safety

Prior to handling the unit, this instruction manual should be read and understood. If anything needs to be clarified, contact your manufacturer representative.

Read this instruction manual carefully before use and keep for future reference.

This instruction manual remains valid as long as the customer does not change anything on the product.

The unit is intended for industrial use. It must be handled only by technically trained personnel.

Always wear appropriate personal protective equipment in accordance with the local regulations.

The unit has been designed and manufactured in accordance with the state-of-the-art methods. Nevertheless, residual risks may remain, as described in the following chapters and in accordance with the chapter *Intended Use* [➔ 8].

This instruction manual highlights potential hazards where appropriate. Safety notes and warning messages are tagged with one of the keywords DANGER, WARNING, CAUTION, NOTICE and NOTE as follows:



... indicates an imminent dangerous situation that will result in death or serious injuries if not prevented.



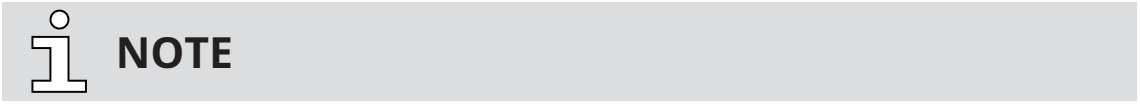
... indicates a potentially dangerous situation that could result in death or serious injuries.



... indicates a potentially dangerous situation that could result in minor injuries.

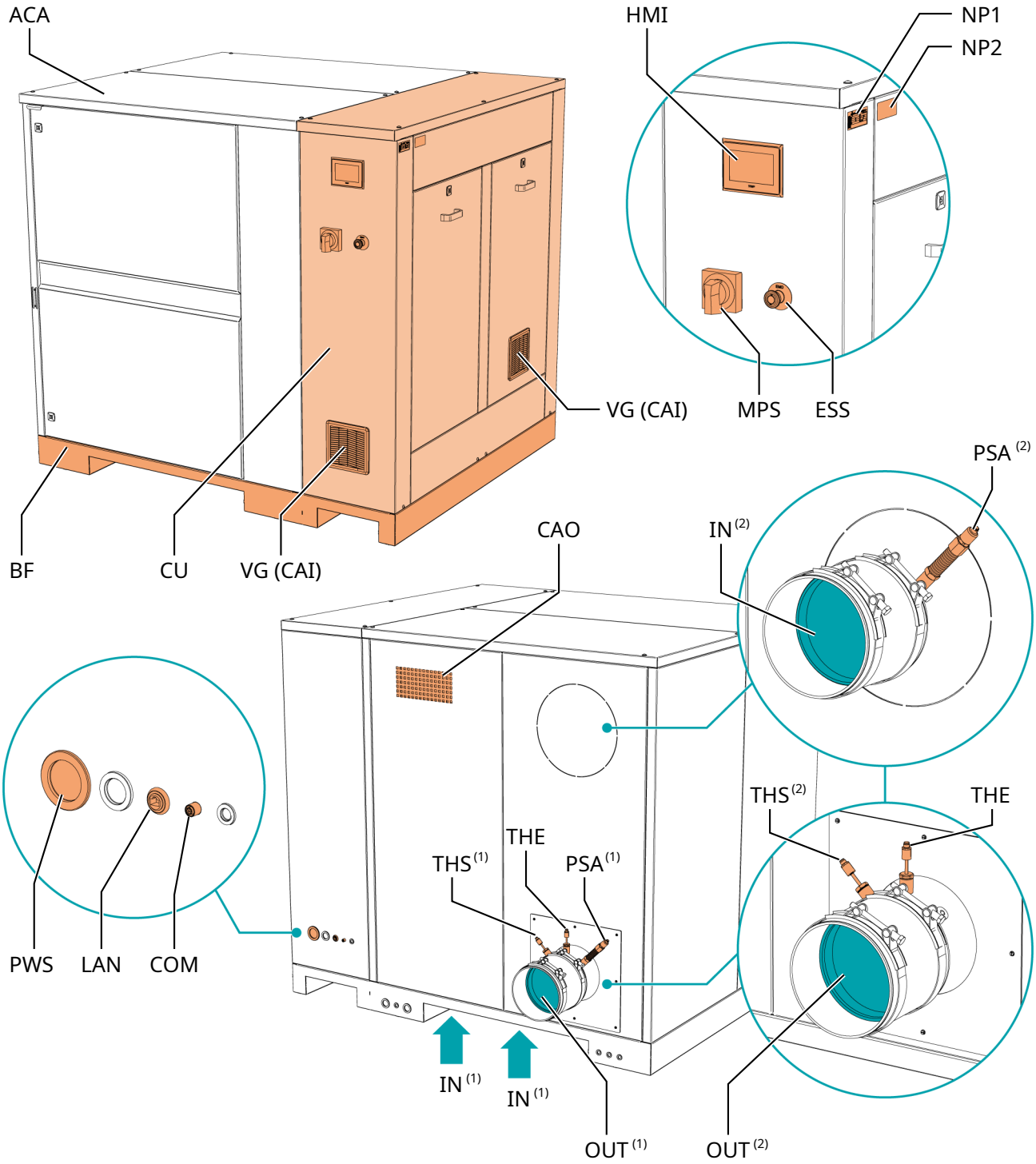


... indicates a potentially dangerous situation that could result in damage to property.



... indicates helpful tips and recommendations, as well as information for efficient and trouble-free operation.

2 Product Description



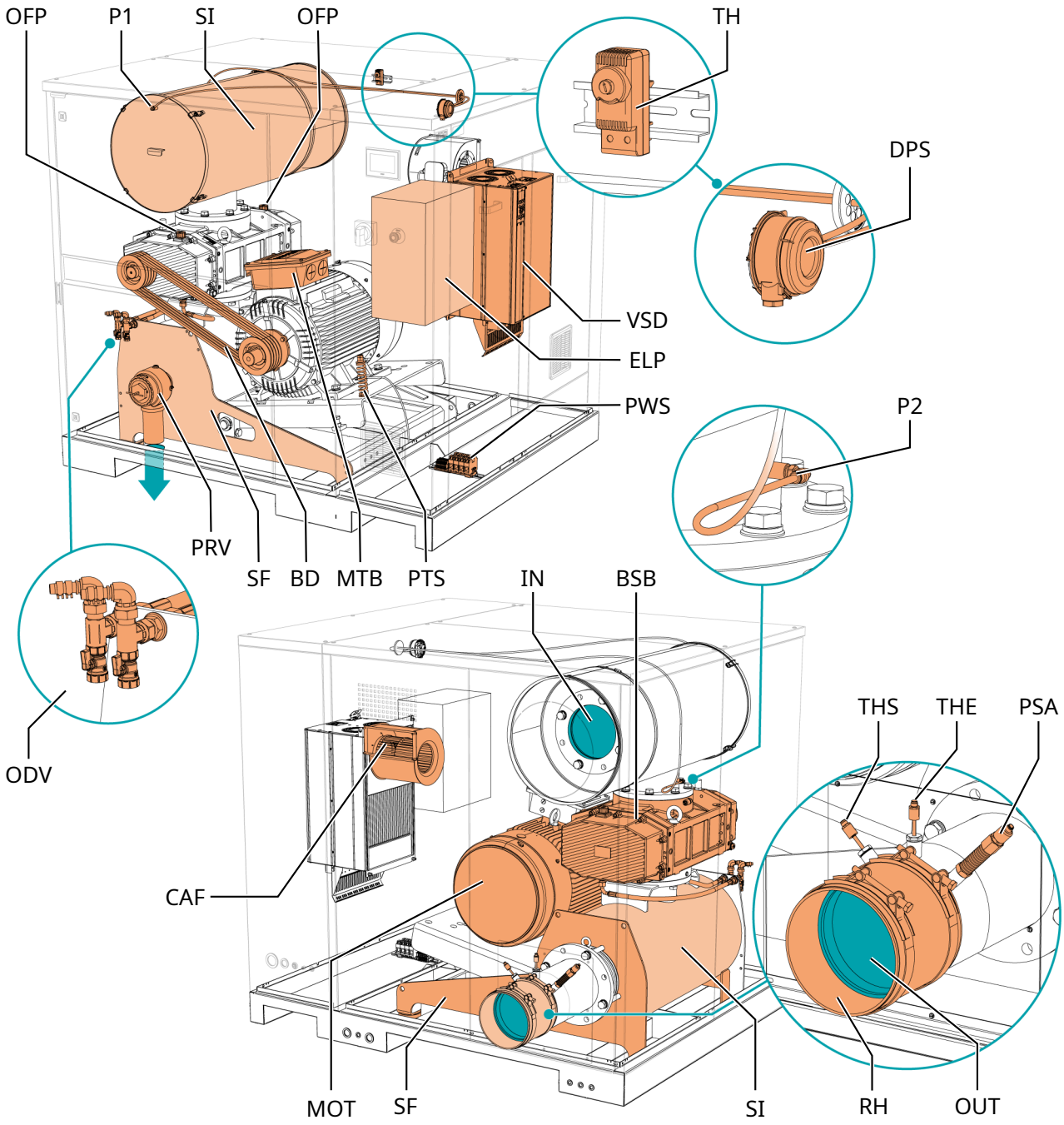
(1) Arrangement for pressure unit only

(2) Arrangement for vacuum unit only

Description			
IN (1)	Air inlet	IN (2)	Blower inlet (Vacuum unit)
OUT	Blower outlet	ACA	Acoustic cabinet
BF	Base frame	CAO	Cooling air outlet
COM	Communication I/O port - option	CU	Control unit
ESS	Emergency stop switch	HMI	User interface (Human-Machine Interface)

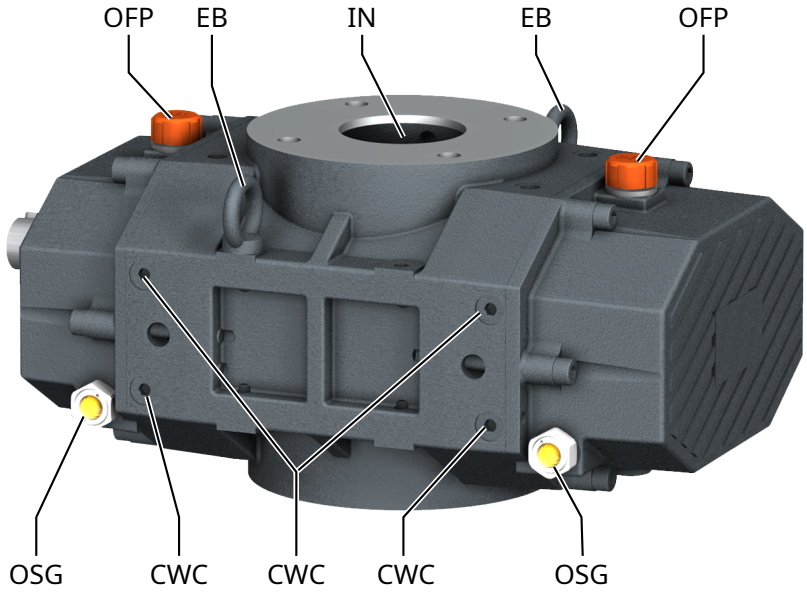
Description			
LAN	LAN Communication port (Modbus TCP/IP) - option	MPS	Main power switch - option
NP1	Name plate (Machine)	NP2	Name plate (Electrical data)
PSA	Pressure transmitter	PWS	Power supply (Cable entry)
THE	Thermal sensor (IoT Box option)	THS	Thermoswitch
VG (CAI)	Ventilation grid (Cooling air inlet)		

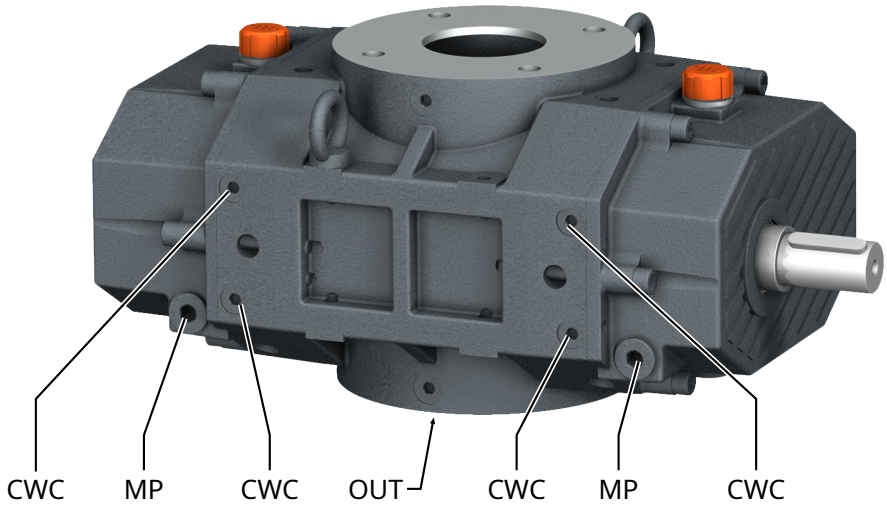
Interior of the TYR PLUS



Description			
IN	Blower inlet (Pressure unit)	OUT	Blower outlet (Pressure unit)
BD	Belt drive	BSB	Bare shaft blower

Description			
CAF	Cabinet fan	DPS	Differential Pressure Switch
ELP	Electrical components plate	MOT	Motor
MTB	Motor terminal box	ODV	Oil drain valves
OFP	Oil fill plug	P1	Inlet pipe 1 (DPS)
P2	Inlet pipe 2 (DPS)	PRV	Pressure relief valve (Safety valve)
PSA	Pressure transmitter	PTS	Pre-tensioning system
PWS	Power supply (Terminal board)	RH	Rubber hose
SF	Supporting frame	SI	Silencer
TH	Thermostat	THE	Thermal sensor (IoT Box option)
THS	Thermoswitch	VSD	Variable Speed Drive





Description			
IN	Blower inlet connection	OUT	Blower outlet connection
CWC	Cooling water connection	EB	Eye bolt
MP	Magnetic plug	OFP	Oil fill plug
OSG	Oil sight glass		

NOTE

Technical term.

In this instruction manual, we consider that the terms ‘machine’ or ‘unit’ refer to the ‘rotary lobe blower package for overpressure or vacuum operation’.

NOTE

Illustrations.

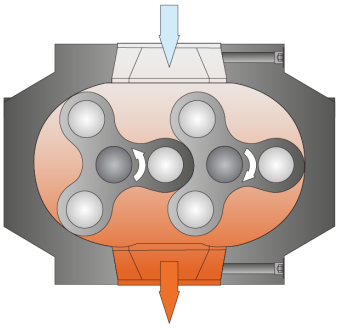
In this instruction manual, the illustrations may differ from the appearance of the unit.

NOTE

Illustrations.

In this instruction manual, some maintenance illustrations are those of the TYR WT 0100-0730 CP/CV. Although not shown in the TYR WT 0600-0730 CP/CV PLUS configuration, the principles are similar.

2.1 Operating Principle



The machine with tri-lobe rotors works on the principle of oil-free gas transport.

Two identical lobes rotate in opposite direction in the casing, transporting fixed volume of air with each turn. There is no contact between the rotors and also between rotor and casing, therefore process does not require oil in the working area. The machine transports the gas without increasing the pressure.

Gas is compressed in the machine outlet by the gas that has been already transported (blowers with external compression).

2.2 Intended Use

WARNING

In case of foreseeable misuse outside the intended use of the unit.

Risk of injuries!

Risk of damage to the unit!

Risk of damage to the environment!

- Make sure to follow all instructions described in this manual.

The unit is intended for transport of air and other dry, non-aggressive, non-toxic, non-ignitable and non-explosive gases.

The unit is intended for indoor placement in a potentially non-explosive environment.

The unit is designed for indoor installations. For outdoor installations, consult your Busch representative for special precautions.

The unit is suitable for continuous and intermittent operation.

Permitted environmental conditions, see *Technical Data* [➔ 60].

NOTICE

Chemical compatibility of the process gases with the machine component materials.

Risk of corrosion inside the blower working area which can reduce performance and its lifetime!

- Check if the process gases are compatible with those following materials:
  - Cast iron
  - Steel
  - Aluminum
  - Fluor elastomer (FKM/FPM)
- Contact your Busch representative for further advice and information.

2.3 Start Controls

The machine is equipped with a Variable Speed Drive (VSD) and a Touch Screen (HMI).

2.4 Optional Accessories

2.4.1 OTTO IoT Box



The unit can be equipped with the OTTO IoT Box.

It allows the rotary lobe blower package for overpressure or vacuum operation to be connected to the Busch Cloud and collect live measured data during its operation.

For the activation and setup of this optional function, contact your Busch representative.

For any additional information, refer to the specific document “OTTO IoT Box User's Manual, art. no. 0870236702” or contact your Busch representative.

2.4.2 I/O and Communication Port

The control unit (CU) can be equipped with a M12 I/O port and a RJ45 communication port (MODBUS) that can allow remote control and monitoring of the machine.

By using the cable supplied with the machine and making the bridges described below in the customer's electrical installation, it is possible to operate the machine in one of three following modes:

- Setup I/O port,
- Power supply,
- Machine remote start.

Setup I/O port

Connector type: M12 12p female A coded (connection cable included in the scope of supply).

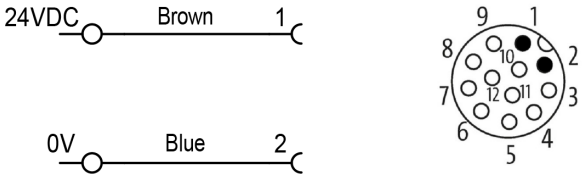
NOTICE

Wiring diagrams.

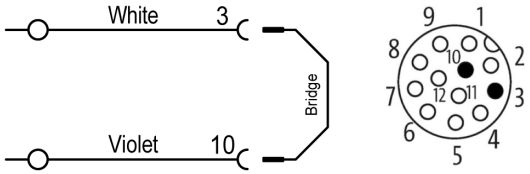
For more information on all the wiring diagrams below, please refer to the electrical wiring diagram inside the control unit (CU).

Power Supply

- 24VDC power supply - Max 1.5A



Remote Unit Start



It allows the machine to be started by an external signal.

If pins 3 and 10 are bridged, the machine will start according to the settings of the HMI.

NOTE

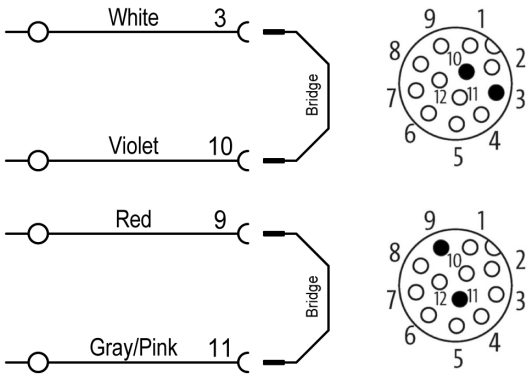
In case of a remote-control start, the machine must be integrated in the user's safety chain (signal warning the user to stop the machine in case of problem or emergency stop).

NOTE

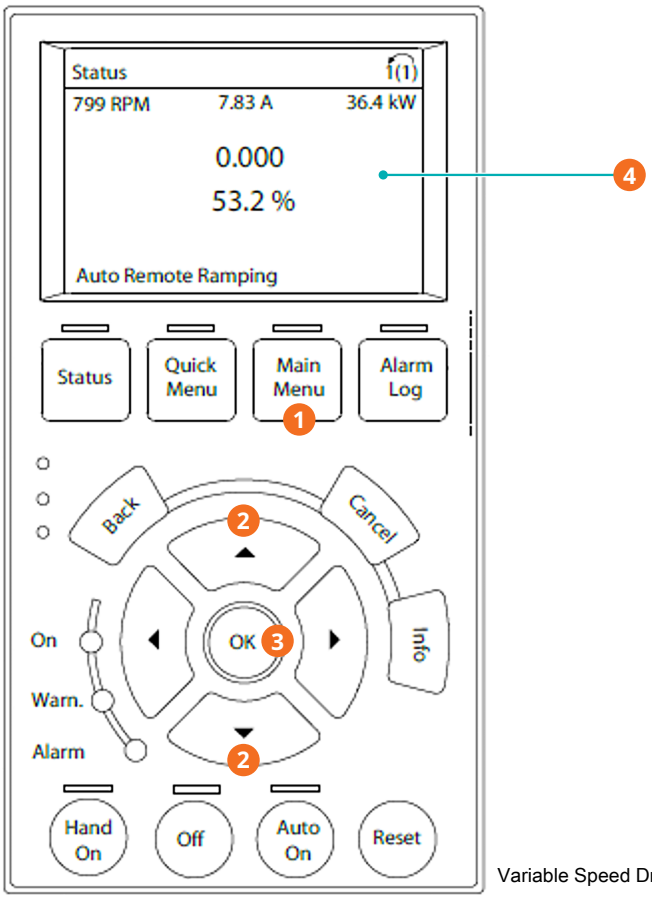
According to the standard factory setting, there is a bridge on the terminals inside the control unit (CU).

- Remove the bridge and connect to “Remote unit start” according to the wiring diagram inside the control unit (CU).

Emergency Start



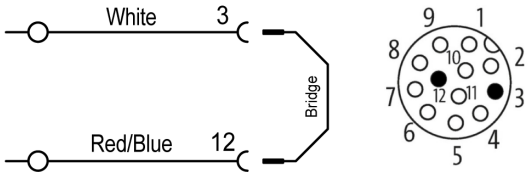
- To activate emergency start, it is necessary to make two bridges by connecting **pins 3 and 10**, and by connecting **pins 9 and 11**.
- Disconnect the green HMI touch screen power connector.
- When disconnected, follow the instructions below to change the variable speed drive (VSD) parameters:



Variable Speed Drive keypad

Description			
1	Press "Main Menu" button	2	With up or down button, select operation "01 Set-up"
3	With "OK" button, select "010 Active Set-up"	4	Enter the value "4" and press "OK" to save

External Safety Switch



It allows to add an external safety element.

- Remove the bridge and put a dry contact instead.

NOTE

The bridge is mandatory in case of a remote-control use.

NOTE

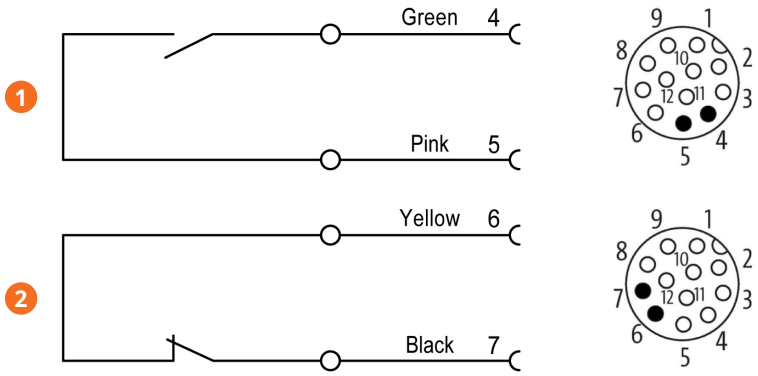
According to the standard factory setting, there is a bridge on the terminals inside the control unit (CU).

- Remove the bridge and connect to “Remote safety contact” according to the wiring diagram inside the control unit (CU).

External Contact (Unit Status)

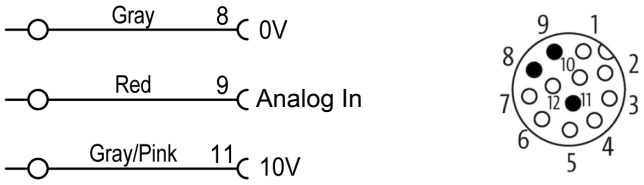
- M12 connector Max 30VAC/DC 1.5A
- On terminal Max 250VAC/30VDC 5A

Unit ON: Pins 4-5 ON	**Unit OFF**: Pins 4-5 OFF
Unit KO: Pins 6-7 ON	**Unit OK**: Pins 6-7 OFF



Description			
1	Unit run	2	Unit alarm

Remote Control Analog Input 0-10V



Speed or pressure can be controlled linearly by a 0-10V remote control via terminal or connectors.

NOTE

The signal is galvanically isolated.

Modbus Control

For more information:

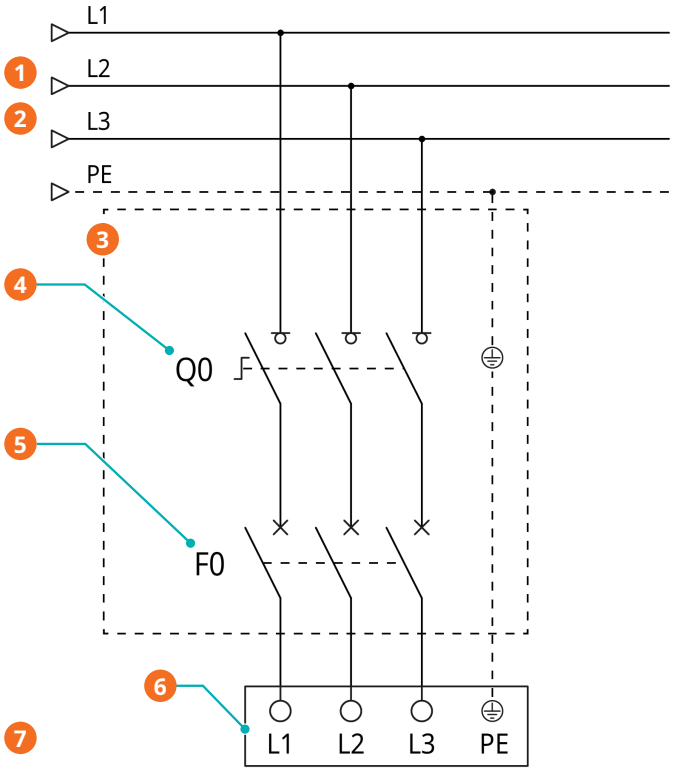
- See *Modbus Control and Ethernet Settings* [➔ 27].

2.4.3 Main Power Switch / Breaker

The machine can be equipped with a power switch for connecting or disconnecting it from the mains.

In case this power switch is not installed, an equivalent device must be installed in the customer's system.

Customer power supply



Description			
1	Power supply Standard Control Unit: 3L+PE 380-460V +/-10% (50/60Hz)	2	Wire gauge according to EN 60204-1
3	Must be provided by the customer	4	Lockable disconnect switch - option
5	Overload protection*	6	Unit terminal board (L1, L2, L3, PE to the control unit)
7	The complete wiring diagram of the control unit is placed inside the electrical cabinet.		

* C-curve - See chapter Technical Data.

Size of cable entry: M63 x 1.5 (cable Ø ► 8 ... 52 mm)

3 Transport and Handling



WARNING

Suspended load.

Risk of severe injury!

- Do not walk, stand, or work under suspended loads.



WARNING

Lifting the machine using the motor eye bolt.

Risk of severe injury!

- Do not lift the machine using the eye bolt fitted to the motor.
- Only lift the machine as shown.

NOTICE

If the unit is already filled with oil.

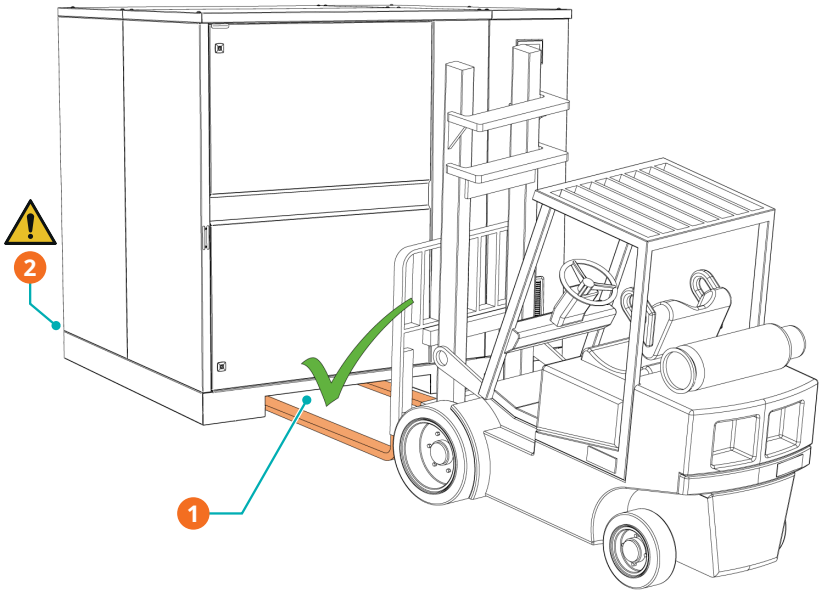
Tilting a unit already filled with oil can cause a large amount of oil to ingress into the casing.

- Drain the oil before each transport or always transport the unit horizontally.

- Check that the unit has not been damaged during transport.

If the unit is mounted and secured on a transport support (pallet):

- Remove the unit from the transport support before installation.



Description			
1	WARNING! Make sure to slide both forks into the left-hand opening of the machine base frame (BF).	2	WARNING! Make sure both forks protrude from the opposite side before lifting the machine.

4 Storage

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.
- Store the unit indoors, in a dry place, away from dust and vibrations and if possible, in original packaging, preferably at temperatures between 0 ... 40 °C.

If the unit is to be stored for more than 3 months:

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.
- Wrap the unit in a corrosion inhibitor film.
- Store the unit indoors, in a dry place, away from dust and vibrations and if possible, in original packaging, preferably at temperatures between 0 ... 40 °C.
- Rotate the blower shaft by hand to renew the lubrication traces.

WARNING

Blower shaft.

- Rotate the blower shaft by hand at least during installation, just before starting the unit.

NOTICE

Long storage time (over 6 months).

Risk of damage to the unit!

- The blower shaft must be rotated by hand periodically, at least once every three months, to renew the grease on the bearing rings. This procedure must also be recorded in a periodic register.
- In the event of prolonged storage or storage in a warehouse subject to significant temperature fluctuations and/or an aggressive atmosphere, the rotary lobe blower must be prepared according to a special Busch Vyroba CZ s.r.o. procedure (depending on the information provided by the customer when preparing the order).
- All specific preparations and procedures must always be retained during storage.
- The rotary lobe blower must be wrapped in special VCI film for the duration of storage.

➔ Failure to follow these procedures may invalidate the product warranty.

NOTICE

Long storage time (over 12 months).

Risk of damage to the unit!

- Due to a long storage time, the capacitors of the variable speed drive can lose efficiency because of electrochemical processes. In the worst case, it can lead to a short-circuit and therefore to a damage to the variable speed drive of the unit.
- Connect the unit every 12 months for 60 minutes to the mains.

5 Installation

5.1 Installation Conditions

WARNING

Blower shaft.

- Rotate the blower shaft by hand at least during installation, just before starting the unit.

NOTICE

Use of the unit outside of the permitted installation conditions.

Risk of premature failure!

Loss of efficiency!

- Make sure that the installation conditions are fully respected.

- Make sure that the environment of the unit is not potentially explosive.
- Make sure that the ambient conditions comply with the *Technical Data* [➔ 60].
- Make sure that the environmental conditions comply with the protection class of the motor and the electrical elements.
- Make sure that the installation space or location is protected from weather and lightning.
- Make sure that the installation space or location is vented such that sufficient cooling of the unit is provided.
- Make sure that cooling air inlets (CAI) and outlets (CAO) are not covered or obstructed and that the cooling air flow is not affected adversely in any other way.
- Make sure that enough space remains for maintenance work.
- Check the oil level, see *Oil Level Inspection* [➔ 48].
- Make sure that all provided covers, guards, hoods, etc. are mounted.
- Make sure that the machine is secured against movement.

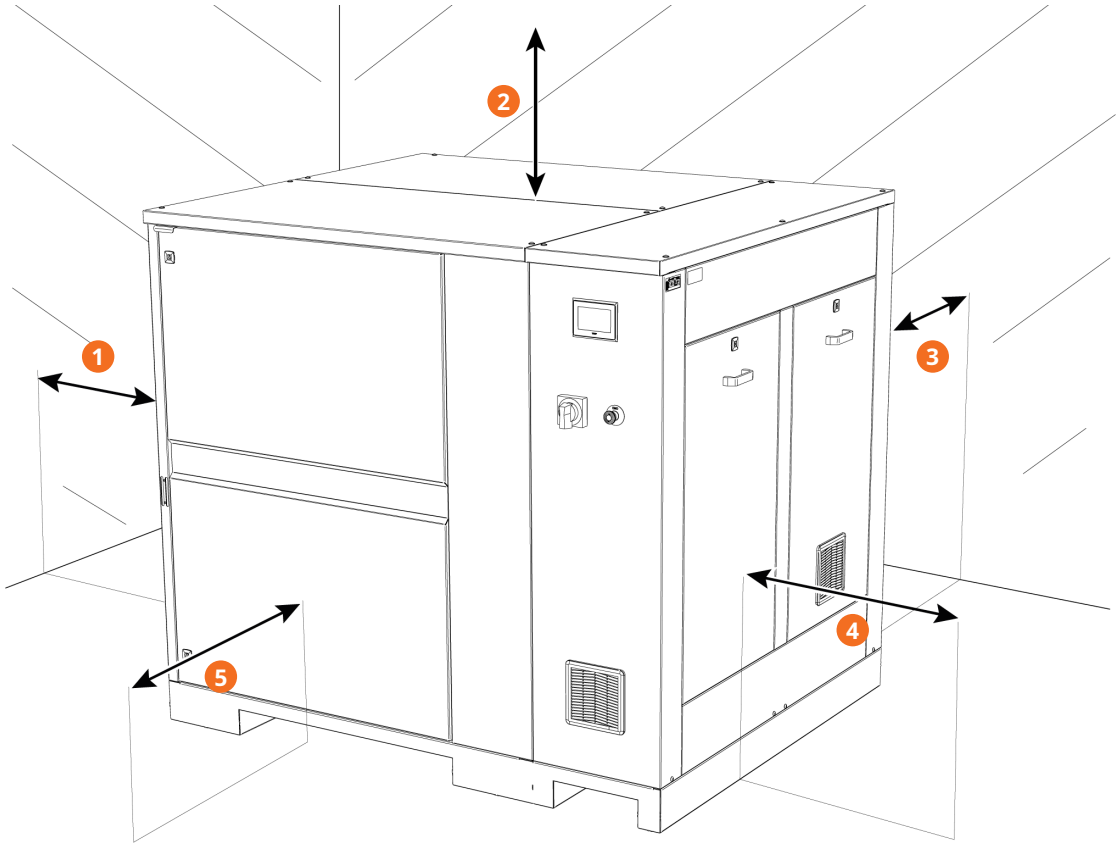
5.2 Blower Unit Installation

The machine must be installed horizontally on a flat surface.

The maximum permissible irregularity of the machine base/inclination can be expressed as follows:

- From left to right and front to back: maximum 0.5° inclination.

- Make sure to observe the following installation distances:



Description			
1	Left side: min. 1000 mm to allow removal of panels for access to the machine and maintenance	2	Top side: no requirement
3	Back side: min. 1000 mm to allow removal of panels for access to the machine and maintenance, and access to outlet and sensors	4	Right side: min. 1000 mm to allow removal of panels for acces to terminal board and control unit
5	Front side: min. 2000 mm to allow removal of panels for access to the machine and maintenance		

- Make sure the machine is secured to the concrete base using anchors (see *Securing the Machine to the Floor* [➔ 19].)

5.2.1 Securing the Machine to the Floor

WARNING

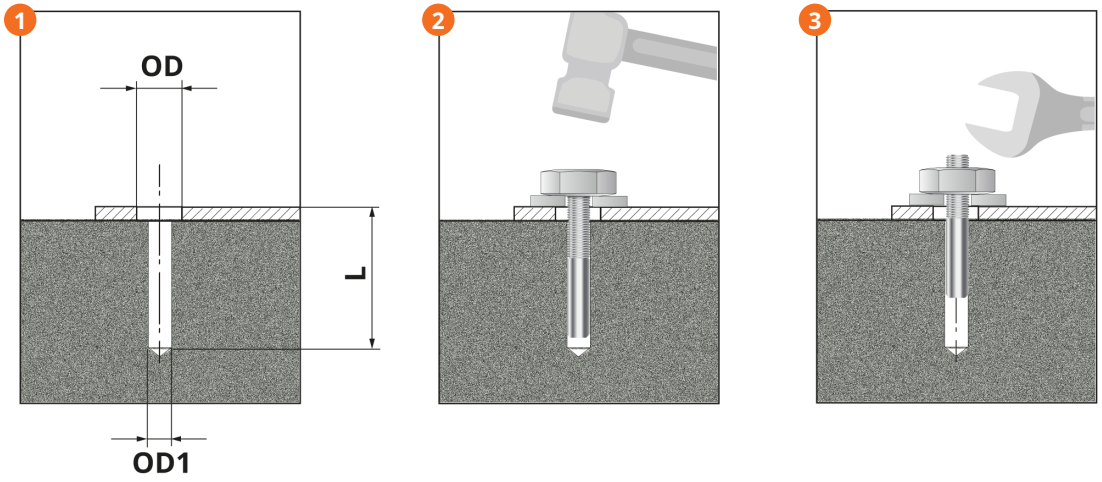
After installation, the unit must be anchored to the floor.

Risk of spontaneous movement!

Risk of damage to the unit!

- Refer to the dimensional drawing for position of mounting holes.

Anchoring Procedure



Description			
1	Drill a hole and clean it	2	Stick the anchor into the hole
3	Tighten the nut		

5.3 Connecting Lines / Pipes

WARNING

Connecting lines can accumulate an electrostatic charge.

Risk of severe injury!

Risk of damage to the machine!

- Connecting lines must be made of conductive material, or measures must be taken to prevent electrostatic charging.
- Exhaust connecting lines must be made of heat-resistant material.

- Remove all protective covers before installation.
- Make sure that the connecting lines cause no stress on the connections of the unit. Therefore, we recommend installing flexible lines at the inlet and exhaust connections.
- Make sure that the diameter of the connecting lines over the entire length is at least as large as the connections of the unit.

In case of long connecting lines:

- Use larger diameters to avoid a loss of efficiency.
- Contact your manufacturer representative for more information.

5.3.1 Inlet Connection



WARNING

Unprotected inlet connection.

Risk of severe injury!

- Do not put hand or fingers in the inlet connection.

NOTICE

Ingress of foreign objects or liquids.

Risk of damage to the unit!

If the inlet gas contains dust or other foreign solid particles:

- Install a suitable filter (5 micron or less) at the inlet of the unit.

Connection size(s):

– Ø 219 mm

Depending on the specific configuration ordered, other connection dimensions may apply.

- Make sure that the connecting lines cause no stress on the connections of the unit. Therefore, we recommend installing flexible lines at the inlet and exhaust connections.

5.3.2 Exhaust Connection

NOTICE

Exhaust gas flow obstructed.

Risk of damage to the unit!

- Make sure that the exhaust gas will flow without obstruction.

Connection size(s):

– Ø 219 mm

Depending on the specific configuration ordered, other connection dimensions may apply.

- Make sure that the connecting lines cause no stress on the connections of the unit. Therefore, we recommend installing flexible lines at the inlet and exhaust connections.

5.4 Filling Oil

NOTICE

Use of inappropriate oil.

Risk of premature failure!

Loss of efficiency!

- Use only a type of oil previously approved and recommended by the manufacturer.
- Refer to the type of oil specified on the name plate of the machine.

WARNING

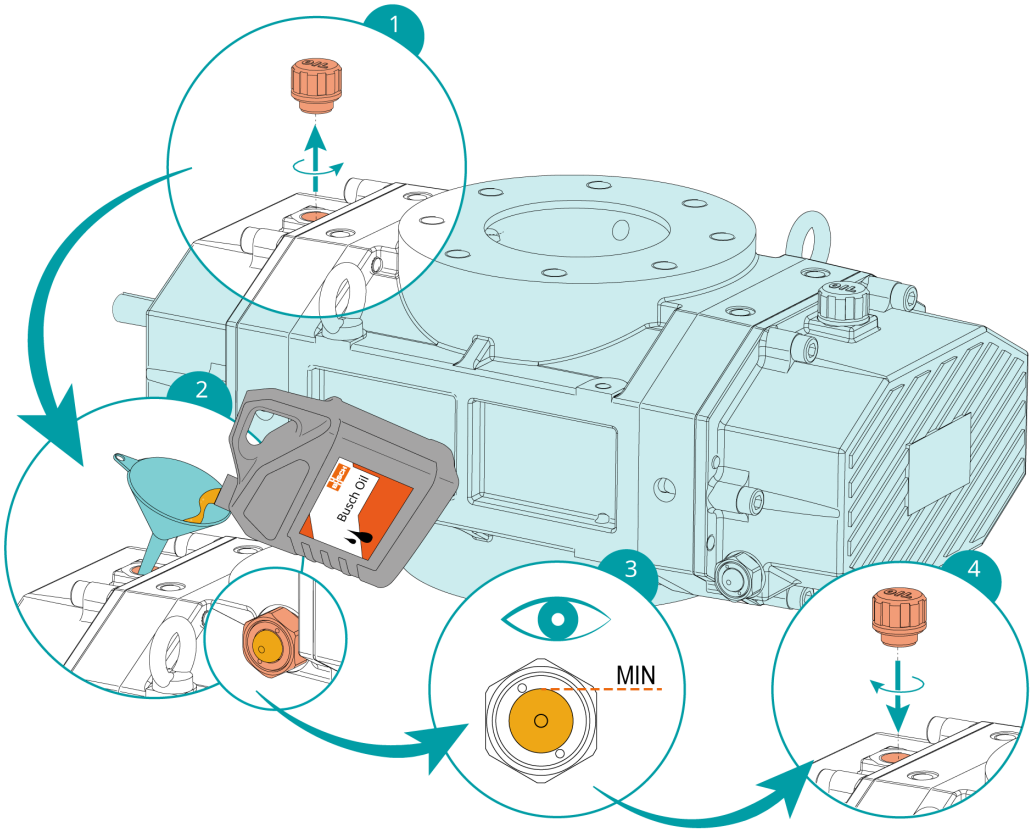
Oil overfilling.

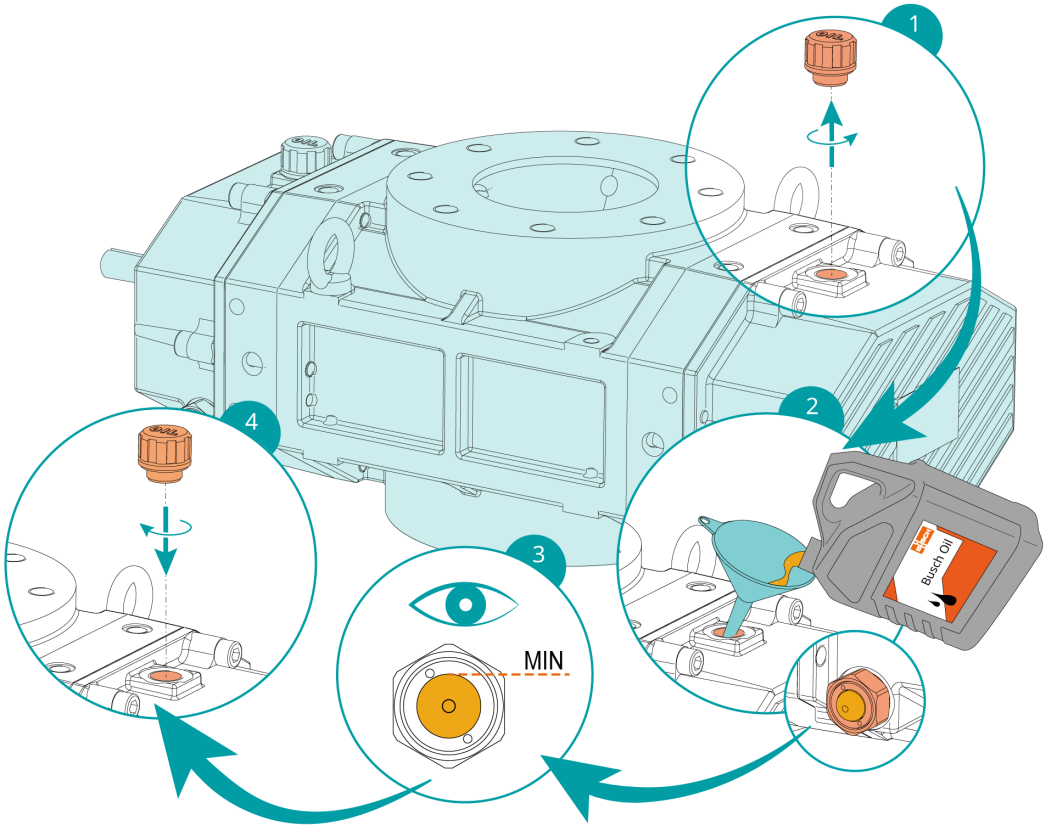
Risk of increased operating temperature and increased absorbed power!

Risk of damage to the machine!

- Make sure to always fill the correct amount of oil.

- For information on oil type and filling capacities, see the *Technical Data* [➔ 60] and *Oil* [➔ 61] chapters.





When oil filling is complete:

- Note the date of the oil change on the sticker.



If there is no sticker on the machine:

- Order it from your Busch representative (article number 0565 568 959).

6 Electrical Connection



DANGER

Live wires.

Risk of electrical shock!

- Electrical installation work must only be executed by qualified personnel.

INSTALLATION(S) CURRENT PROTECTION:



DANGER

Missing current protection.

Risk of electrical shock!

- Provide current protection in accordance with EN 60204-1 on your installation(s).
- The electrical installation must comply with the applicable national and international standards.

NOTICE

Electromagnetic compatibility.

- Make sure that the motor of the unit will not be affected by electric or electromagnetic disturbance from the mains. If necessary, contact your Busch representative for more information.
- Make sure that the EMC of the unit is compliant with the requirements of your supply network system, if necessary, provide further interference suppression (EMC of the unit, see *EU Declaration of Conformity* [➔ 62] or *UK Declaration of Conformity* [➔ 63]).

NOTICE

The motor frequency is below 25 Hz.

Risk of damage to the machine!

6.1 PLUS Machine



DANGER

Live wires. Carry out any work on the variable speed drive and motor.

Risk of electrical shock!

- Electrical installation work must only be executed by qualified personnel.



DANGER

Maintenance work without switching off the power supply to the control unit.

Risk of electrical shock!

- Switch off the power supply to the control unit with a lockable disconnect switch before attempting any work on it. High voltages are present at the terminals and within the variable speed drive for up to 10 minutes after disconnecting the electrical supply.
- Always ensure, by using a suitable two-pole voltage tester, that no voltage is present on any drive power terminals before starting any work.



DANGER

Maintenance work without disconnecting the variable speed drive.

Risk of electrical shock!

- Disconnect and isolate the variable speed drive before attempting any work on it.
  High voltages are present at the terminals and within the variable speed drive for up to 10 minutes after disconnecting the electrical supply.
- Always ensure, by using a suitable two-pole voltage tester, that no voltage is present on any drive power terminals before starting any work.

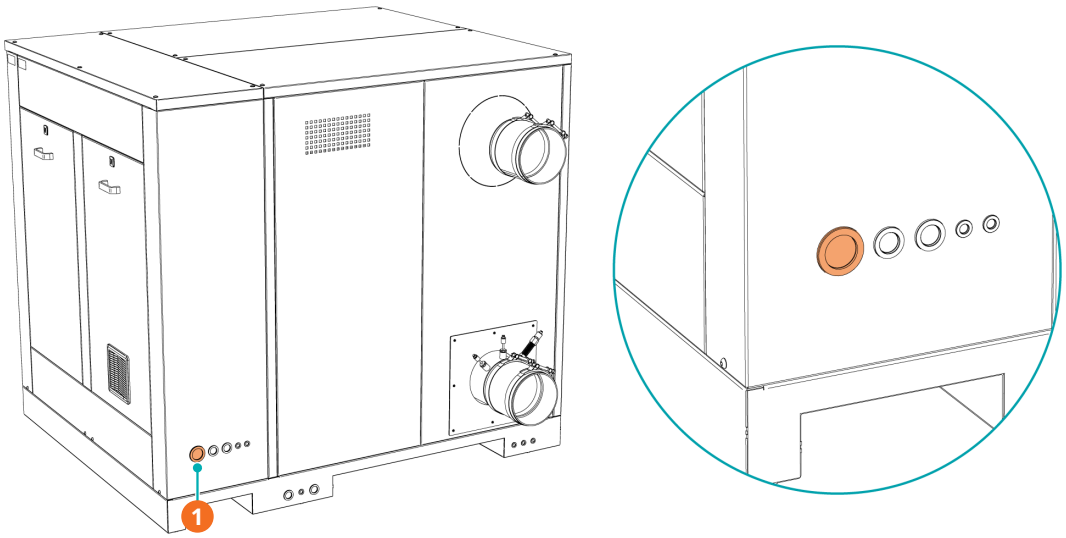
- Make sure that the power supply is compatible with the data on the name plate of the control unit (CU).
- If the unit is equipped with a power connector, install a residual current protective device to protect persons in case of a defective insulation.
  - Busch recommends installing a type B residual protective device suitable for the electrical installation.
- If the control unit is not equipped with a lockable disconnect switch, provide it on the power line so that the machine is completely secured during maintenance tasks, or in case of an emergency.
- Provide an overload protection according to EN 60204-1.
  - Busch recommends installing a C-curve circuit breaker.
- Connect the protective earth conductor.
- Electrically connect the machine to the main power supply.
  - See *Main Power Supply Connection* [➔ 26].

NOTICE

Electrical connections for cabinet fan and main motor.

Cables must be routed through the cable entry at the bottom of the rear panel of the control unit (CU), as shown in the illustration below.

- Cut the rubber membrane and insert the cables into the cabinet.



Description			
1	Cable entry for power supply: M63 x 1.5 (cable Ø ▶ 8 ... 52 mm)		

NOTE

After the unit is turned off, the cabinet fan must continue to run for as long as necessary to properly dissipate the accumulated heat.

If the time needs to be changed in the settings:

- Contact your Busch representative for advice.

NOTICE

The admissible motor speed exceeds the recommendation.

Risk of damage to the machine!

- Check the admissible motor speed range, see *Technical Data* [➔ 60].

NOTICE

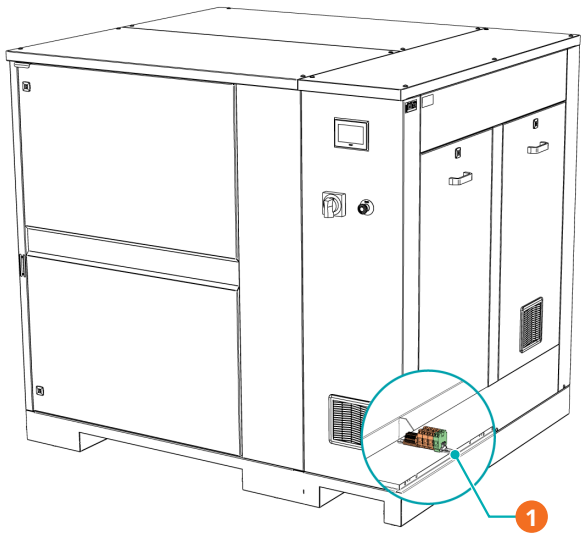
Incorrect connection.

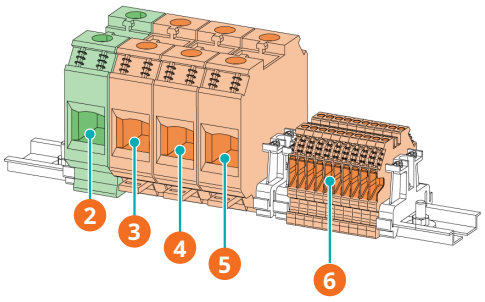
Risk of damage to the control unit!

- The wiring diagrams below are examples only. See inside the control unit for connection instructions and diagrams.

6.2 Main Power Supply Connection

Size of cable entry: M63 x 1.5 (cable Ø ► 8 ... 52 mm)





Description			
1	Main power supply connection (inside view of the control unit - CU)	2	X1-PE
3	X1-L3	4	X1-L2
5	X1-L1	6	From right to left: 1, 2, 3, 4, 5, 6, 7, 8, 21, 22, 23, 24V, 0V

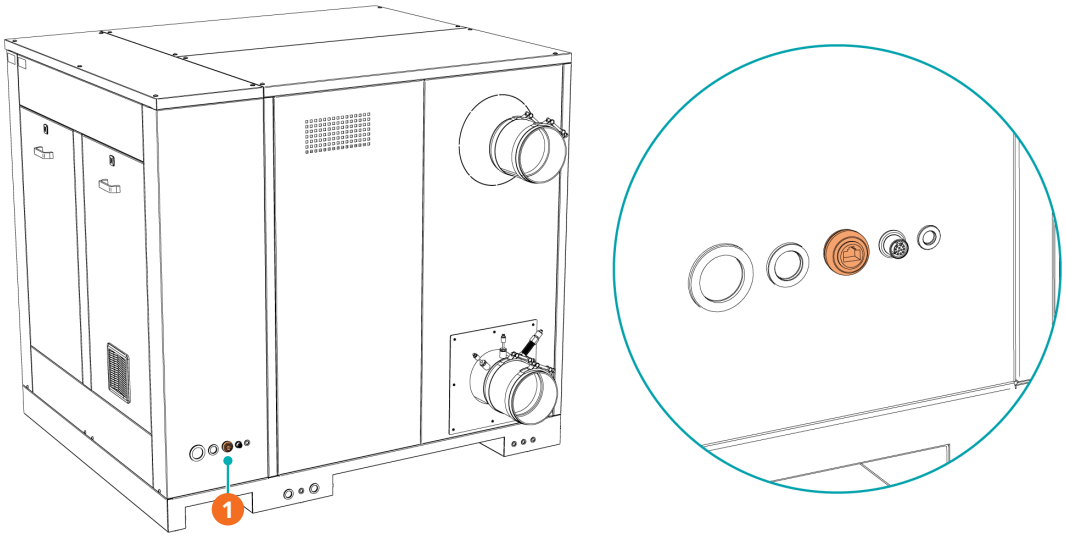
6.3 Modbus Control and Ethernet Settings

The user interface (HMI) works in Modbus with “Holding Registers”, readable and writable, 16 bits. The default ethernet settings are the following:

Description	Default value
IP address	192.168.0.100
Subnet mask	255.255.255.0
Gateway	192.168.0.1
Port no.	502 (cannot be changed)
Slave ID no.	1-255 (all are functioning)

To control the machine via Modbus TCP/IP:

- Select the control mode “Remote/Modbus control”.
- Connect your system to the ethernet RJ45 port located on the back of the control unit (rear panel).



Description			
1	LAN Communication port (Modbus TCP/IP)		

- Configure the *Ethernet Settings* [➔ 43].

NOTE

Monitoring via Modbus.

Do not activate Remote/Modbus for sole monitoring purpose.
This mode is only activated if the machine is fully controlled via Modbus.

6.4 Electrical Connection of the Cooling System

DANGER

Live wires.

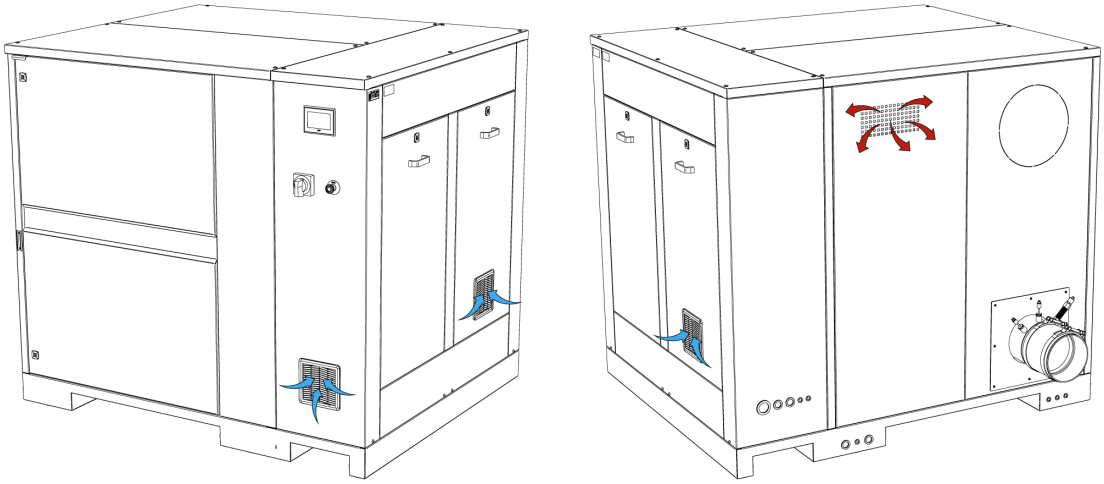
Risk of electrical shock!

- Electrical installation work must only be executed by qualified personnel.

NOTE

No additional wiring is required to connect the air-cooling system of the machine. There is only one connection to be made to the main power supply of the machine.

- Make sure that the power supply for the machine complies with the 380–480 V / 50–60 Hz requirements.
- Make sure that the air flow blows in the right direction according to the following illustration.



7 Commissioning



CAUTION

In operation, the surface of the unit may reach temperatures over 70°C.

Risk of burns!

- Avoid contact with the unit during and directly after operation.

CAUTION



Noise of running unit.

Risk of damage to hearing!

If people are present in the vicinity of a unit that is not insulated from noise for extended periods of time:

- Make sure to wear hearing protection.

- Make sure that the *Installation Conditions* [➔ 17] are met.
- Start the unit.
  - In “Local Control Mode”, push the START button for 2 seconds on the HMI screen.
  - In “Remote Control Mode”, the unit will start automatically.
- Make sure that the maximum permissible number of starts does not exceed 6 starts per hour. Those starts should be spread within the hour.
- Make sure that the operating conditions comply with the *Technical Data* [➔ 60].
- After a few minutes of operation, perform an *Oil Level Inspection* [➔ 48].

As soon as the unit is used under normal operating conditions:

- Measure the motor current and record it as reference for future maintenance and trouble-shooting work.
- To do this, check the “Unit current” on the first “MONITORING” screen/page of the HMI, see *Monitoring (Operating Data)* [➔ 32].

NOTICE

The unit is normally shipped with oil.

Before commissioning:

- Check the oil level, see *Oil Level Inspection* [➔ 48].
- Fill up if necessary, see *Filling Oil* [➔ 21].

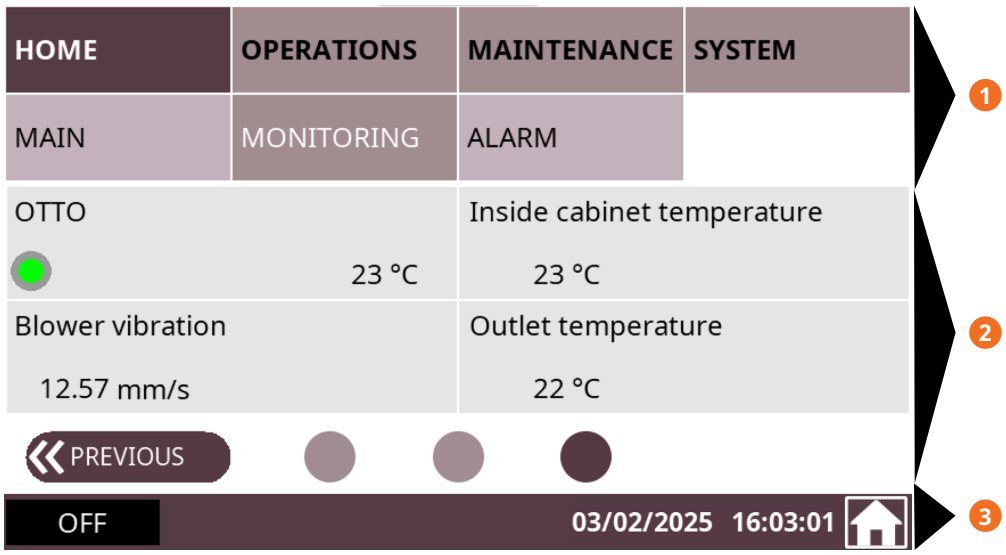
7.1 Description of User Interface Functions

The following functions and parameters are available on the TOUCH SCREEN - HMI interface:

- Language selection (English at first step)
- Date and time
- Units such as pressure (mbar, hPa, TORR) and temperature (°C and °F)
- Inlet pressure
- Ethernet settings
- P&ID control settings
- Pressure control settings
- Service indicator such as operating hours, hours to next oil service

Interface overview

The menu consists of four main tabs (Home, Operations, Maintenance, System) with their own sub-tabs.



Description			
1	Menu tabs and sub-tabs	2	Information panel
3	Bottom bar		

7.1.1 Roles and Users

Three roles of user rights are predefined in the system.

Role 1 ► Operator

This role is intended for machine operators to control the machine (limited rights) or monitor operating values. It does not require any password.

Role 2 ► Installation/Maintenance technician

This role is intended for installation/maintenance technicians to configure the machine according to the application. The password for this role can be found in the separate sheet attached to this instruction manual and allows an access to the following features:

- Change operating mode,
- Reset hours before the next service,
- Set the remote control and monitoring parameters.

Role 3 ► Busch Service

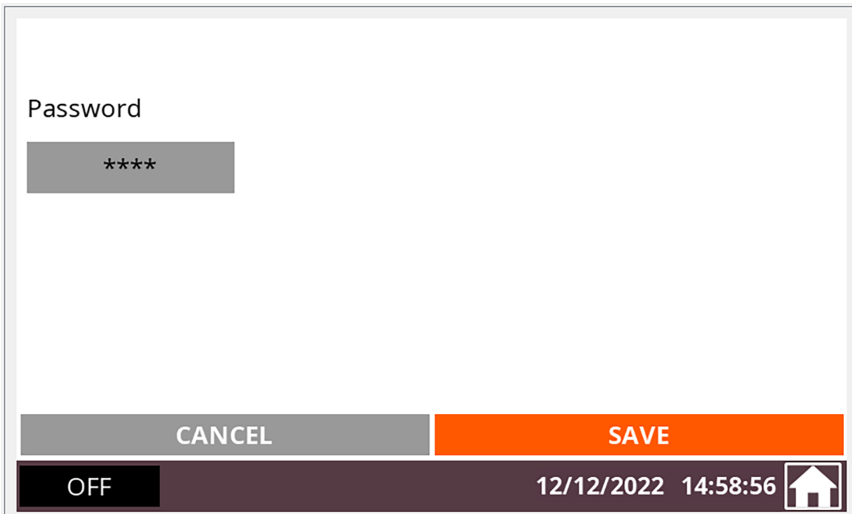
Only authorized personnel from Busch Service have this level of access rights.

NOTE

In case of any questions related to the machine settings:

- Contact Busch Service.

When a password is required, the display shows the following screen:



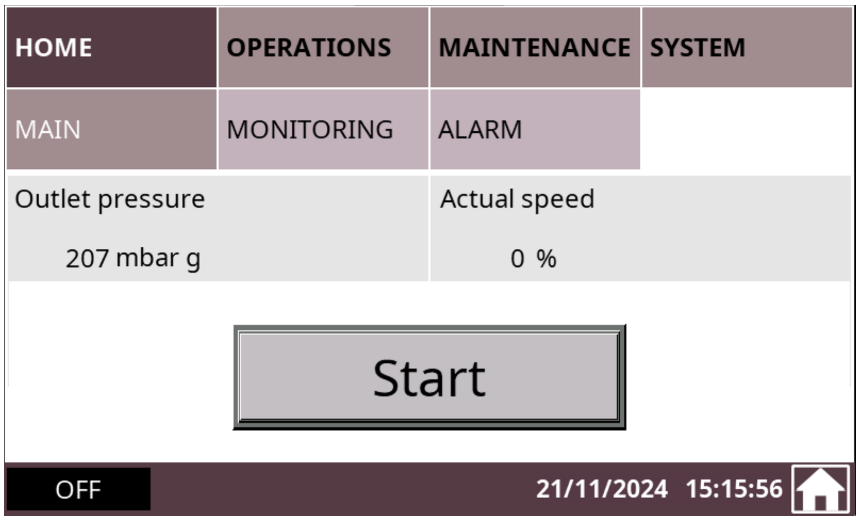
- Press the stars in the password field.
- Enter the correct password in the number pad according to your access right.
- Press “Save”.
- From now on, the specific rights are open for a limited period ► delay of 5 minutes.

7.1.2 Home

7.1.2.1 Main

The display “HOME > MAIN” is the main display.

It is mainly useful for live monitoring.

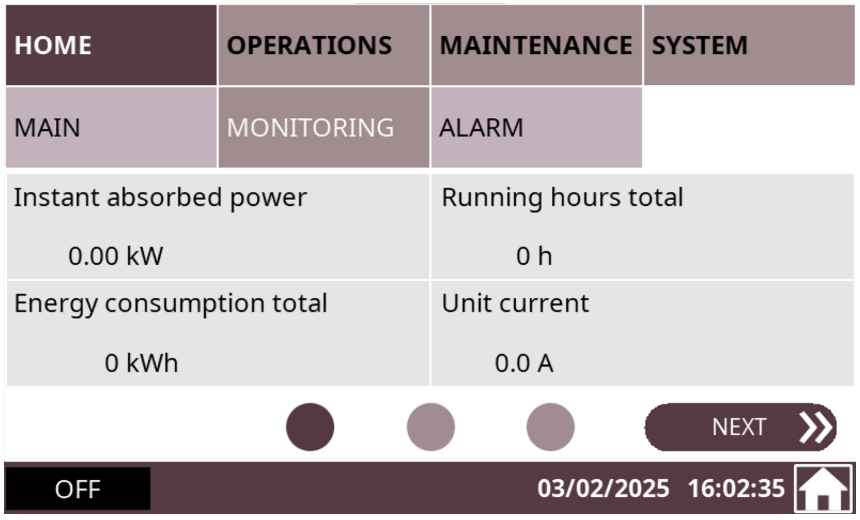


7.1.2.2 Monitoring (Operating Data)

The display “HOME” > “MONITORING” shows the operating values.

It is divided into three different screens/pages.

Screen/Page MONITORING 1



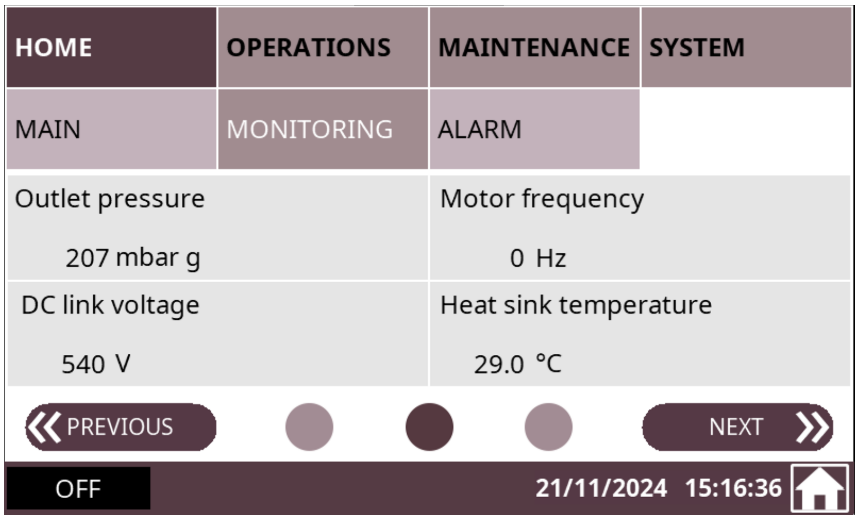
Instant absorbed power. Indicates in kW the absorbed power in real time.

Running hours total. Indicates the total number of operating hours since the first machine commissioning.

Energy consumption total. Indicates in kWh the total consumption of energy since the first machine commissioning.

Unit current. Indicates in ampere unit (A) the value of the unit current in real time.

Screen/Page MONITORING 2



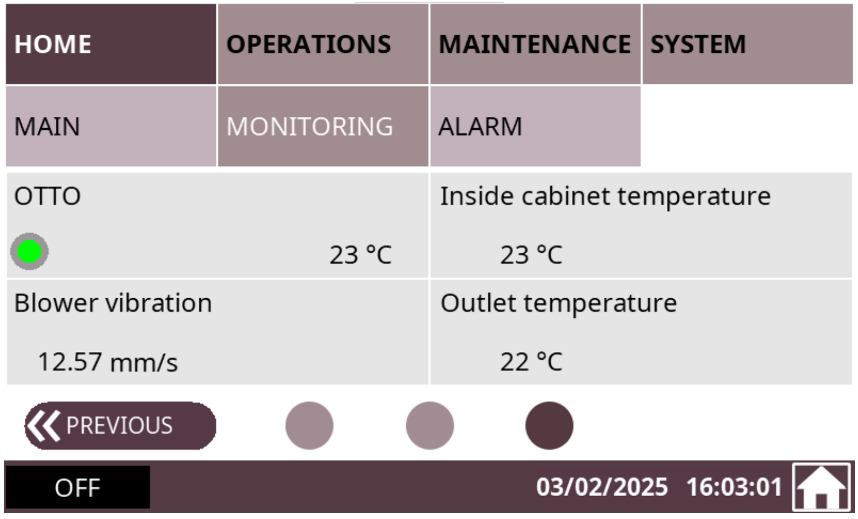
Outlet pressure. Indicates the pressure at the outlet of the unit.

Motor frequency. Indicates in Hz the current drive frequency.

DC link voltage. Indicates the VSD voltage before conversion to motor voltage.

Heat sink temperature. Indicates the temperature of the VSD heat sink (heat dissipater). If the temperature is too high, an alarm occurs.

Screen/Page MONITORING 3



OTTO. Indicates if the IoT function is activated and the internal temperature of the control box.

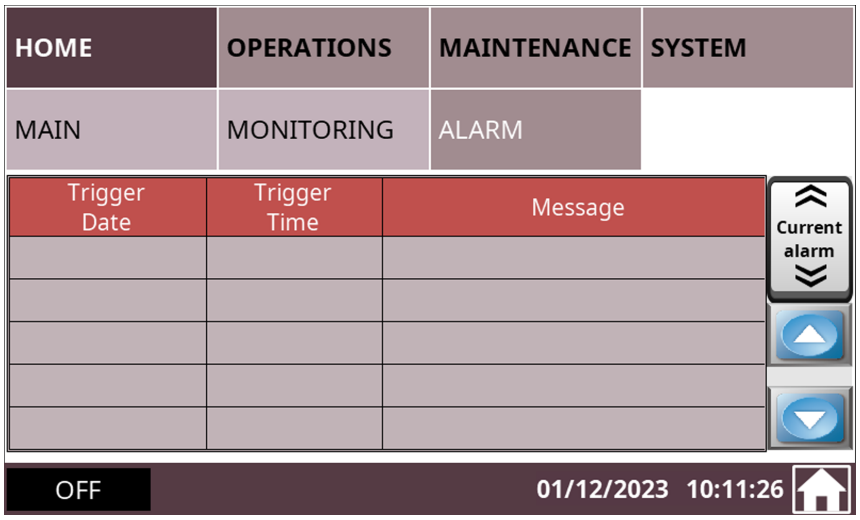
Inside cabinet temperature. Indicates the temperature inside the cabinet.

Blower (or Vacuum Pump) vibration. Indicates in mm/s the level of vibration of the blower (when the unit is used in pressure mode) or vacuum pump (when the unit is used in vacuum mode).

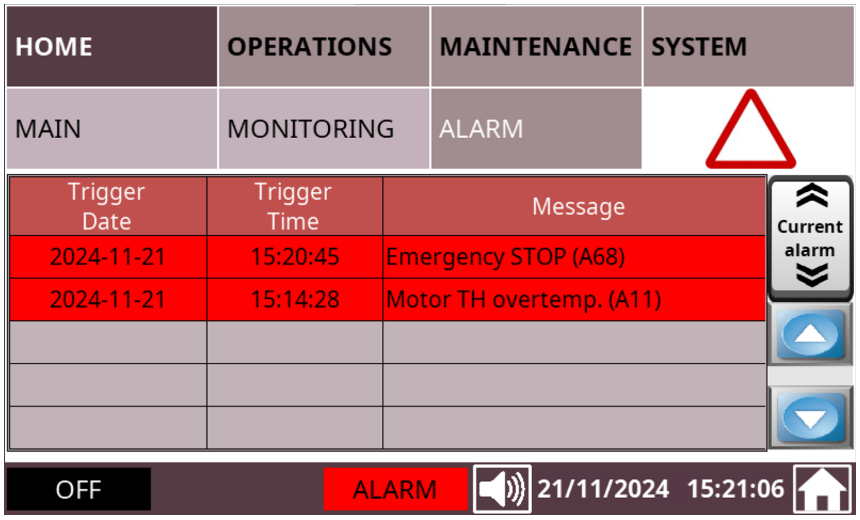
Outlet temperature. Indicates the temperature of the outlet.

7.1.2.3 Alarms

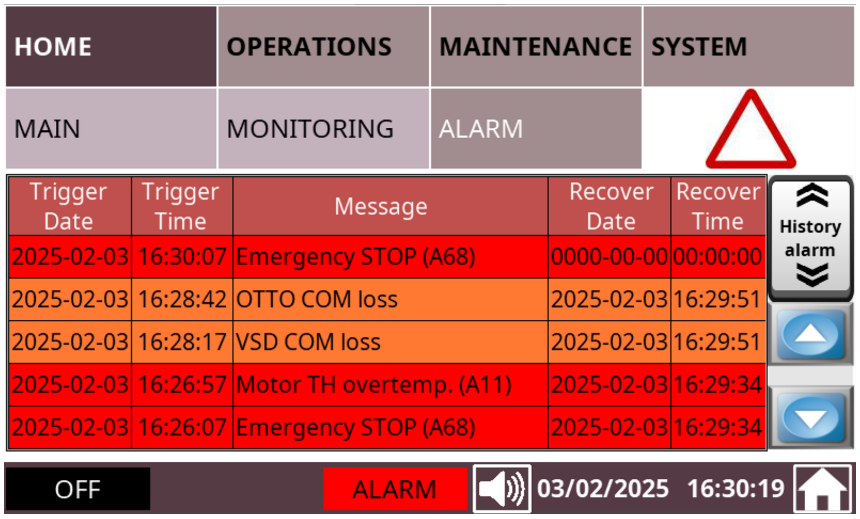
The display “HOME” > “ALARM” shows the history of the alarms’ signals registered by the unit monitoring sensors.



When an alarm occurs, an audible alarm sounds, and the user must acknowledge the default on the HMI interface.



By pressing the “Current alarm” button, the display changes to “History alarm”.



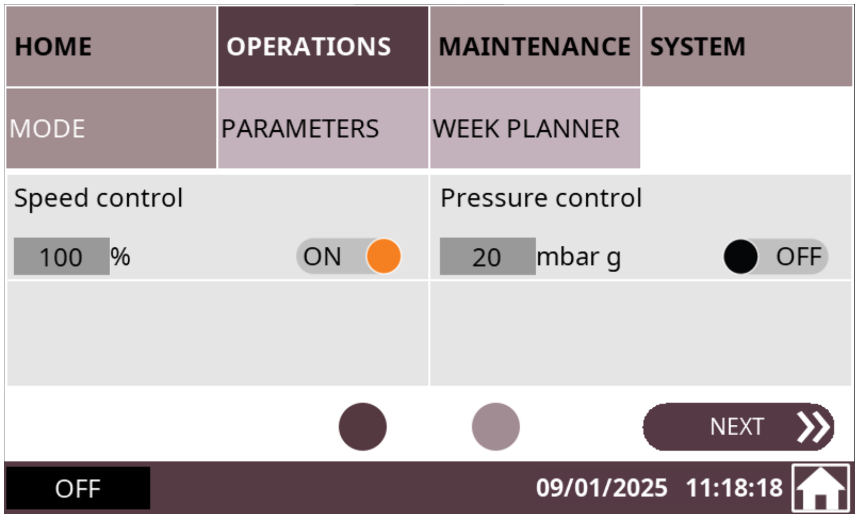
7.1.3 Operations

7.1.3.1 Operation Modes

The display “OPERATIONS > MODE” shows the modes of operation.

It allows the control of the machine.

- To access the operating mode menu:
  - Go to “OPERATIONS” > “MODE” and stay on the first screen/page.



Speed control. Configured by default with a unit speed of 100%, the speed control mode allows the variation of the motor frequency.

- To change the unit speed:
  - Press on the speed percentage (password required, see *Roles and Users* [➔ 31]).
  - Assign the desired speed percentage on the keypad and press “Enter”.

Parameter	Default value	Adjustment range*
Speed control (target speed)	100%	1 ... 100 %

* In percentage of the operating speed range

- For more information on "pumping speed" versus "% speed", refer to the unit performance curves.

Pressure control. The pressure control mode allows to maintain a constant pressure level (target pressure) by automatically adapting the motor frequency.

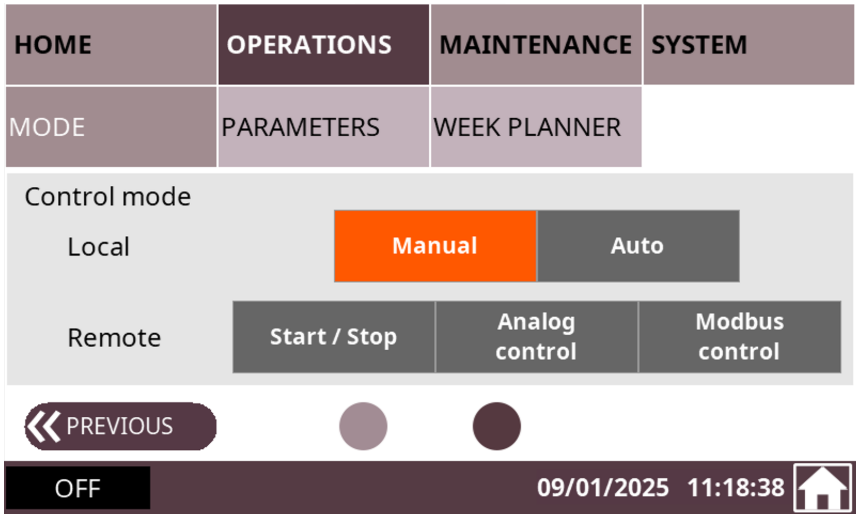
- To switch from speed control to pressure control:
  - Press on the target pressure value (password required, see *Roles and Users* [➔ 31]).
  - Assign the target pressure on the keypad and press “Enter”.
  - Press on the switch button.

Parameter	Default value	Adjustment range
Pressure control (target pressure)	20	0 ... max. pressure allowed (mbar g)*

* The maximum pressure allowed depends on the value set in the HMI, see *System Settings* [➔ 40] > Screen/Page SETTING 3 > “Target pressure limit”.

- For smooth process pressure control, it is required to adjust the PID parameters.
- For more information, contact your Busch representative.

The second screen/page of the display “OPERATIONS > MODE” shows the active **Control mode** of the machine.



7.1.3.2 Operation Parameters

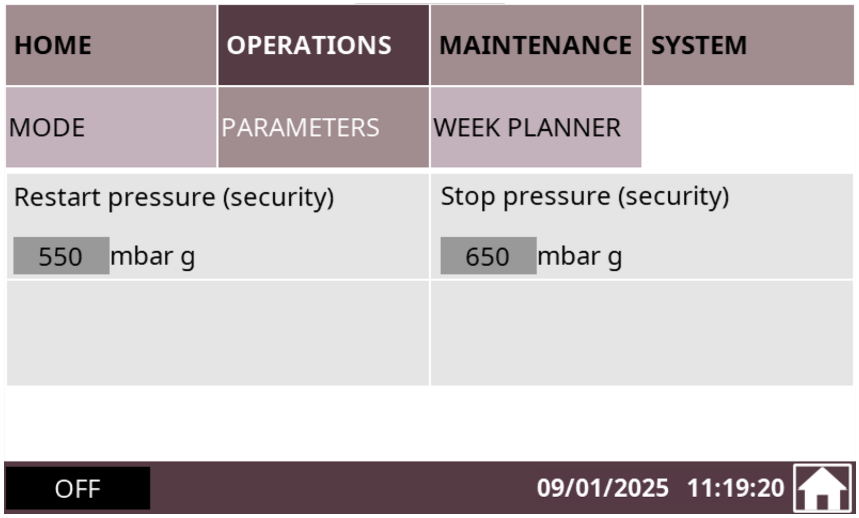
NOTICE

Change parameter values.

Risk of damage to the machine!

- For all the following functions with parameterization, Busch strongly recommends waiting until the end of a unit cycle before changing any parameter value!

The “OPERATIONS > PARAMETERS” screen displays the operating parameters for restart and stop pressure.



Restart pressure (security). Indicates the value of the restart pressure when the stop pressure is reached.

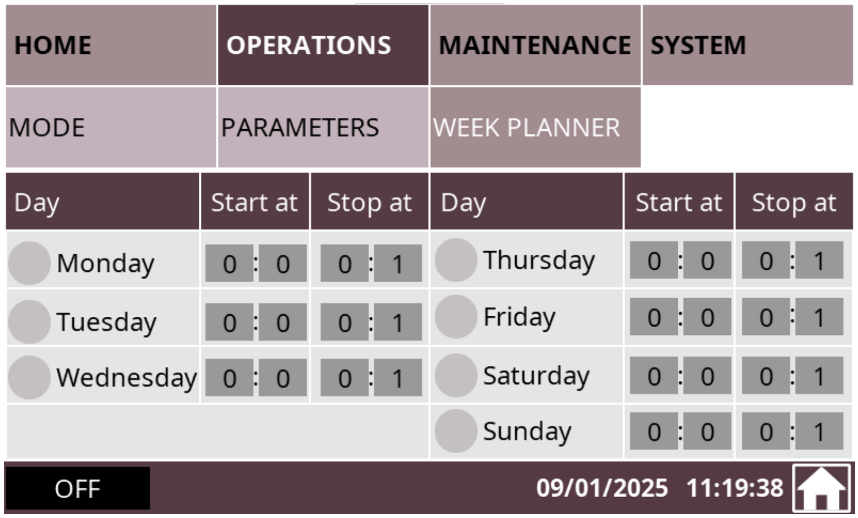
Stop pressure (security). Indicates the safety pressure before activation of the safety valve. The unit stops if this value is reached (no stop in case of trip only).

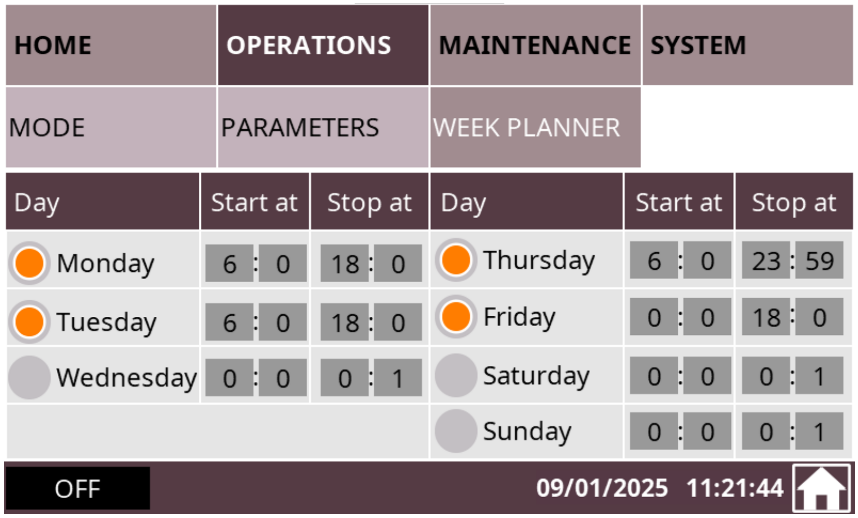
7.1.3.3 Operation Week Planner

The "week planner" function allows definition of a weekly schedule for starting or stopping the machine automatically using the current local settings. A single start and stop a day is possible.

To configure the weekly schedule:

- Go to “OPERATIONS” > “WEEK PLANNER”.
- Press on the days when automatic start and stop are required.
- Set up the start and stop times.





As soon as the schedule is filled in, the control mode “Local/Auto” has to be activated (by “Role 2” users only, see *Roles and Users* [➔ 31]):

- Go the second screen/page of “OPERATIONS” > “MODE” (see chapter *Operation Modes* [➔ 35]).
- Select the mode “AUTO” in the “LOCAL” field (password required).

WARNING

The machine may start without notice.

Risk of severe injury!

As soon as the mode “Local/Auto” is activated:

- Make sure the machine is fully operational when the programmed schedule begins.

NOTE

To allow the machine to operate non-stop from one day to the next one, select 23:59 as the stop time on the first day and 00:00 as the start time on the second day.

NOTE

Manual starts and stops.

The week planner still allows manual starts and stops.

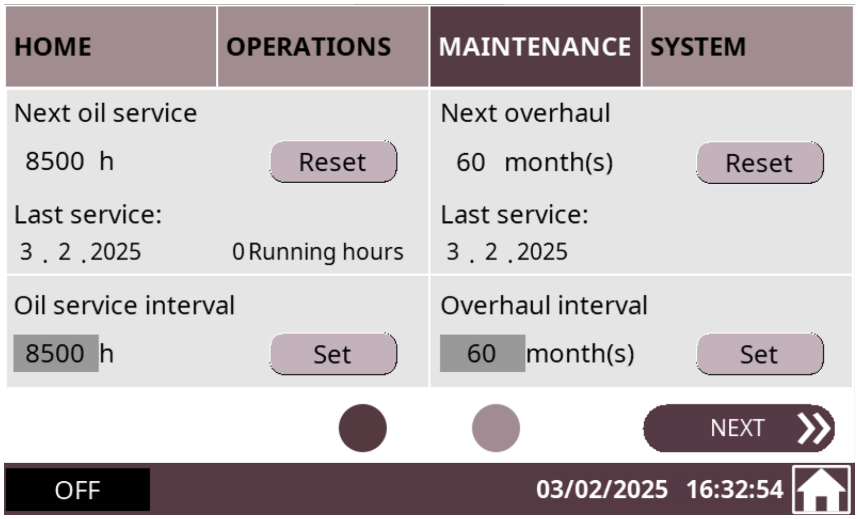
7.1.4 Maintenance

The display “MAINTENANCE” shows the maintenance and service intervals of the machine.

NOTE

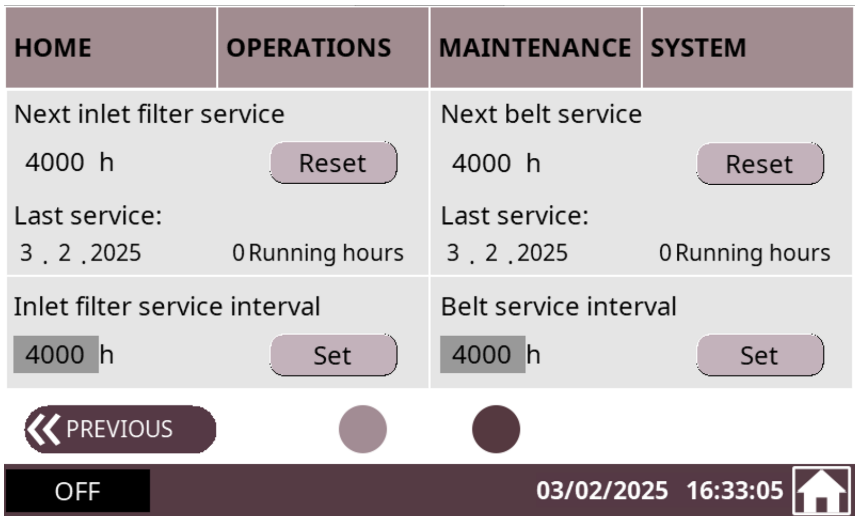
The values must be set according to the application during the unit installation.

Screen/Page MAINTENANCE 1



- Press “**Set**” to define the “**Oil service**” and “**Overhaul**” intervals.
- Press “**Reset**” to reset the operating hours (**running hours**) to 0 after an oil change and/or overhaul.

Screen/Page MAINTENANCE 2



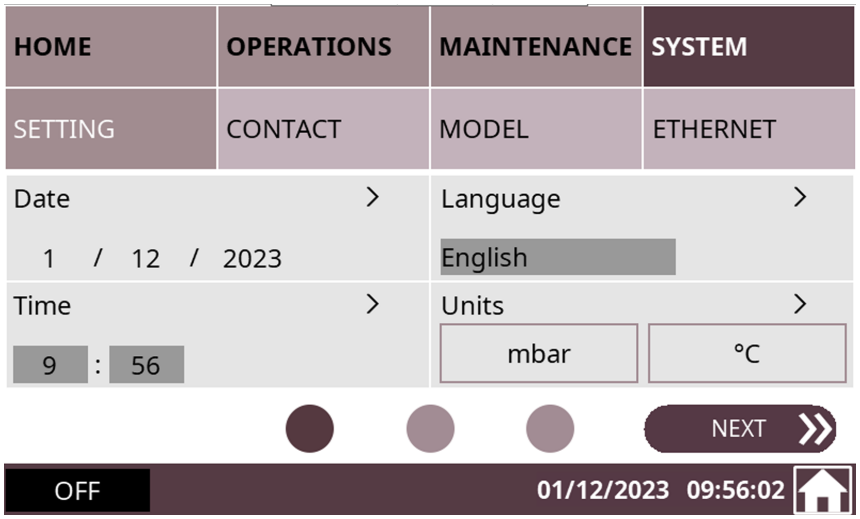
- Press “**Set**” to define the “**Inlet filter service**” and “**Belt service**” intervals.
- Press “**Reset**” to reset the operating hours (**running hours**) to 0 after inlet filter and/or belt maintenance or service.

7.1.5 System

7.1.5.1 System Settings

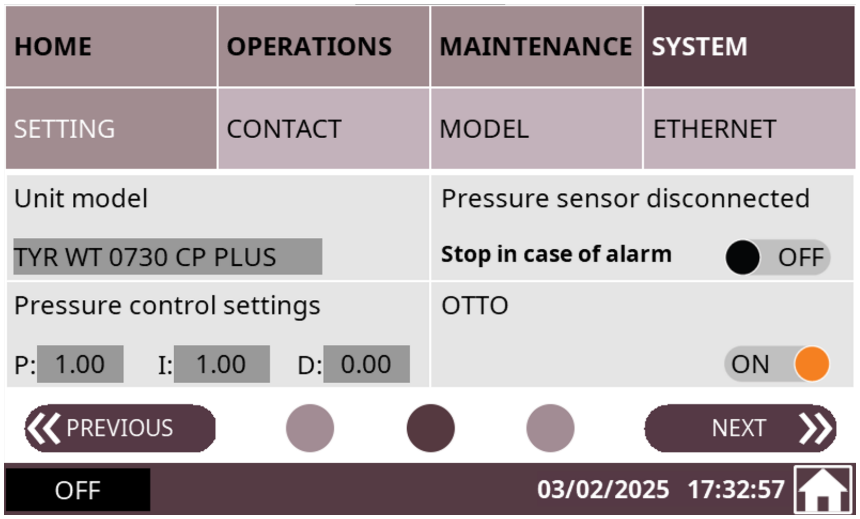
The display “SYSTEM > SETTING” allows to set or change system settings.

Screen/Page SETTING 1



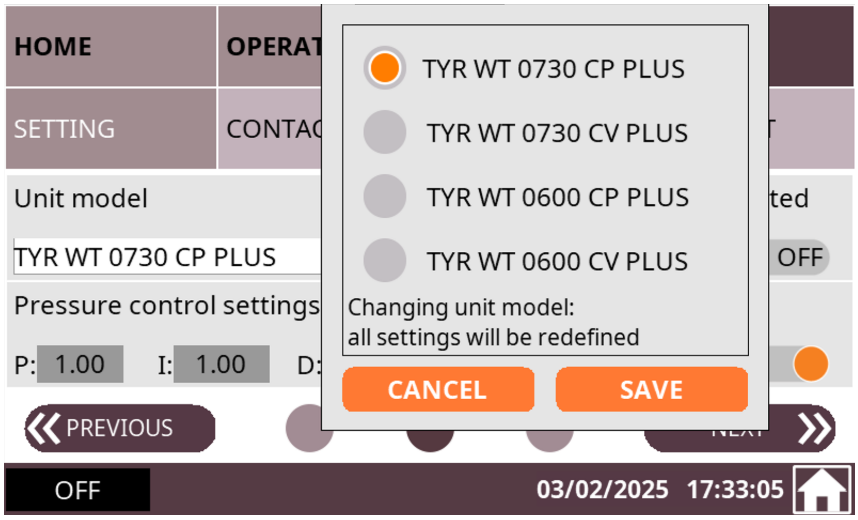
- To edit the system settings such as date, time, language, and units:
  - Go to “SYSTEM” > “SETTINGS”.
  - Press on the value to change the selected data.

Screen/Page SETTING 2

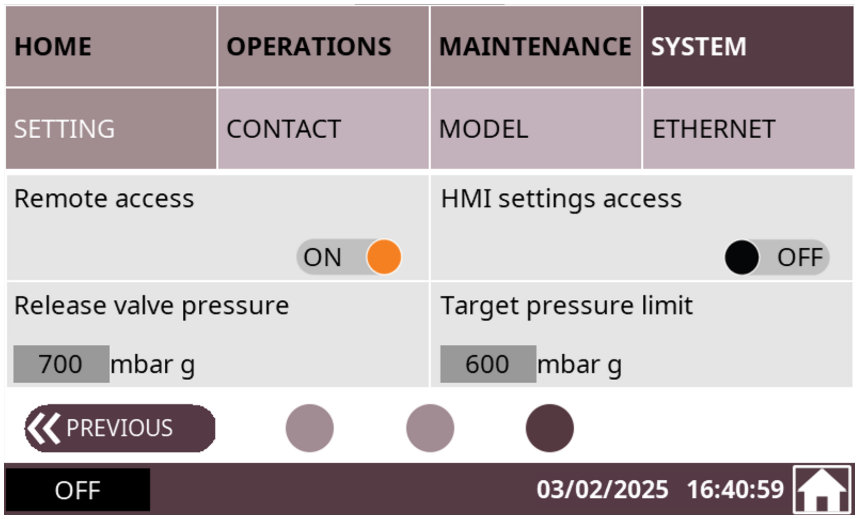


On the second screen/page, it is possible to edit some unit parameters like the pressure control settings (PID) or to activate/deactivate unit functions such as the pressure sensor disconnection alarm or OTTO (Option).

By pressing on the unit model field, it is also possible to switch from one model to another.



Screen/Page SETTING 3



On the third screen/page, it is possible to access the internal settings of the **HMI** by pressing the button for two seconds.

The **Remote access** function allows to take remote control of the HMI using the VNC protocol:

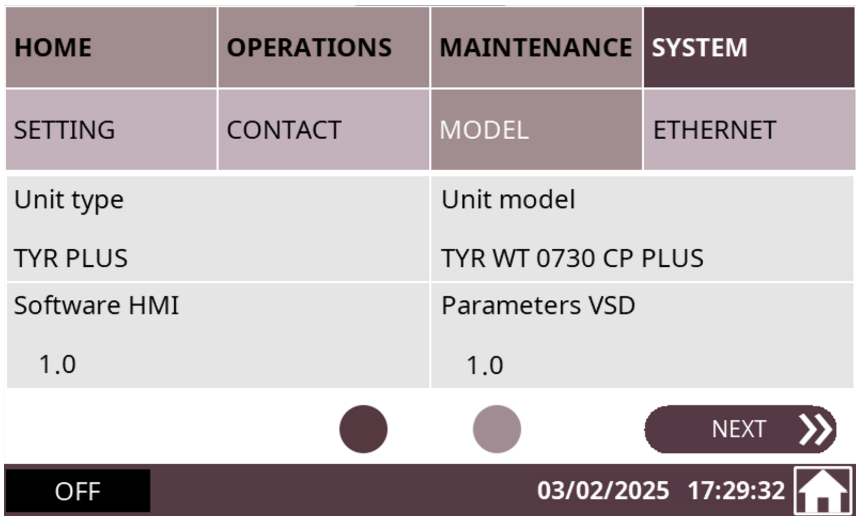
- The VNC protocol is a protocol for remote access to HMI interfaces via a LAN connection (HMI RJ45 port). This protocol uses the IP address of the HMI (192.168.0.100 by default), port 5900 and a password (“adm” by default). A remote viewer such as VNC can also be used.
- For more information, contact your Busch representative.

It is also possible to set the values of **Release valve pressure** and **Target pressure limit**:

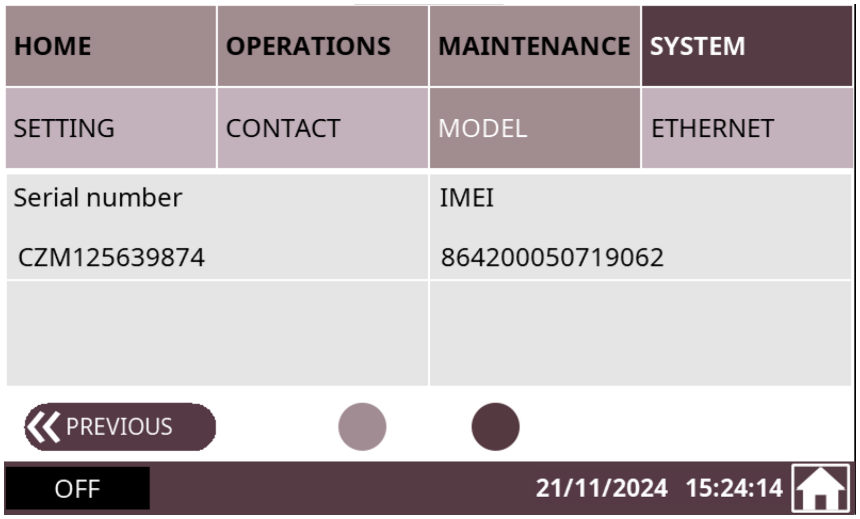
- Press on the value to change the selected data.

7.1.5.2 Model

Screen/Page MODEL 1



Screen/Page MODEL 2



The "SYSTEM > MODEL" display provides the following information.

On screen/page 1:

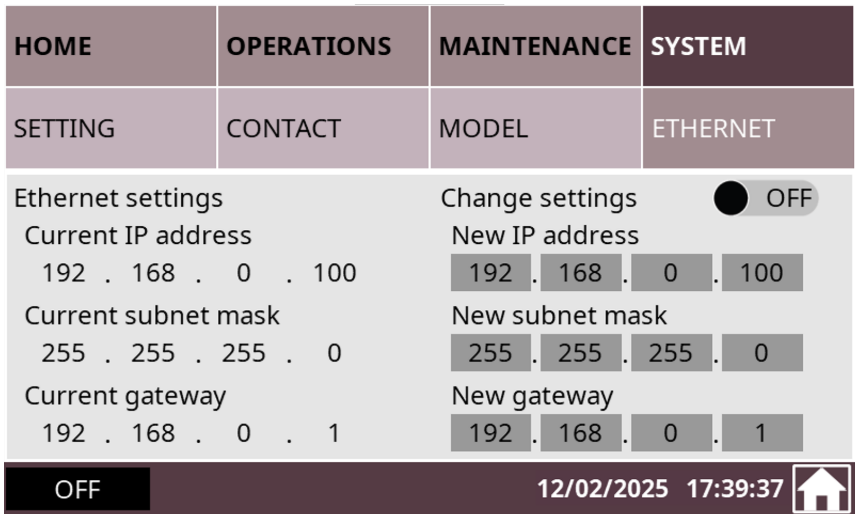
- Type and model of unit,
- Version of HMI software,
- Variable Speed Drive (VSD) parameters.

On screen/page 2:

- Serial number of the unit,
- IMEI of the OTTO IoT Box if the unit is equipped with this option.

7.1.5.3 Ethernet Settings

- To configure the ethernet settings according to your network:
  - Go to “SYSTEM” > “ETHERNET”.



  - Change the values on the right side of the screen (**Change settings**).
  - Press on the switch button to save the new settings.

NOTE

The current Ethernet values are displayed in the left side of the screen (Ethernet settings).

To change these values, it is necessary to fill in all the fields in the right side of the screen (Change settings) before applying the changes by pressing on the switch button:

- New IP address
- New subnet mask
- New gateway

➔ To change the Ethernet settings, it is recommended to connect the unit with the desired equipment beforehand via the Ethernet port available on the right side of the control cabinet (LAN - see illustration in the chapter “Product Description” of the instruction manual of the unit).

The default ethernet settings are the following:

Description	Default value
IP address	192.168.0.100
Subnet mask	255.255.255.0
Gateway	192.168.0.1
Port no.	502 (cannot be changed)
Slave ID no.	1-255 (all are functioning)

For more information:

- See *Modbus Control and Ethernet Settings* [➔ 27].

8 Maintenance



DANGER

Live wires.

Risk of electrical shock!

- Electrical installation work must only be executed by qualified personnel.





WARNING



The unit is contaminated with hazardous material.

Risk of poisoning!

Risk of infection!

If the unit is contaminated with hazardous material:

- Wear appropriate personal protective equipment.



CAUTION

Hot surface.

Risk of burns!

- Before doing anything that requires touching the unit, let it cool down first.



CAUTION

Hot liquids.

Risk of burns!

- Before draining liquids, let the unit cool down first.

CAUTION

Failing to properly maintain the unit.

Risk of injuries!

Risk of premature failure and loss of efficiency!

- Maintenance work must only be executed by qualified personnel.
- Respect the maintenance intervals or ask your Busch representative for service.

NOTICE

Using inappropriate cleaners.

Risk of removing safety stickers and protective paint!

- Do not use incompatible solvents to clean the unit.

- Stop the unit and lock it to prevent accidental start-up.
- Vent the connected lines to atmospheric pressure.

If necessary:

- Disconnect all connections.

8.1 Maintenance Schedule

The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be individually shortened or extended as appropriate.

Particularly harsh applications or heavy-duty operation, such as high dust loads in the environment or in the process gas, other contamination or ingress of process material, can make it necessary to shorten the maintenance intervals significantly.





DANGER

Accidental restart.

Risk of injuries!

- The machine must be de-energized (switched off) at the service circuit breaker and protected against accidental restart during all maintenance work.

Interval	Maintenance work
Monthly (or more often, depending on application)	• Clean the inlet filter and ventilation grids of the cabinet from dust and dirt.
Every 6 months	• Carry out a visual inspection and clean the machine from dust and dirt. • Check the electrical connections and the monitoring devices.
Every 32000 hours	• Bare shaft blower overhaul or replacement is recommended.
According to the motor manual	• Check the motor. • Lubricate the motor if necessary.

8.2 Inlet Filter Maintenance

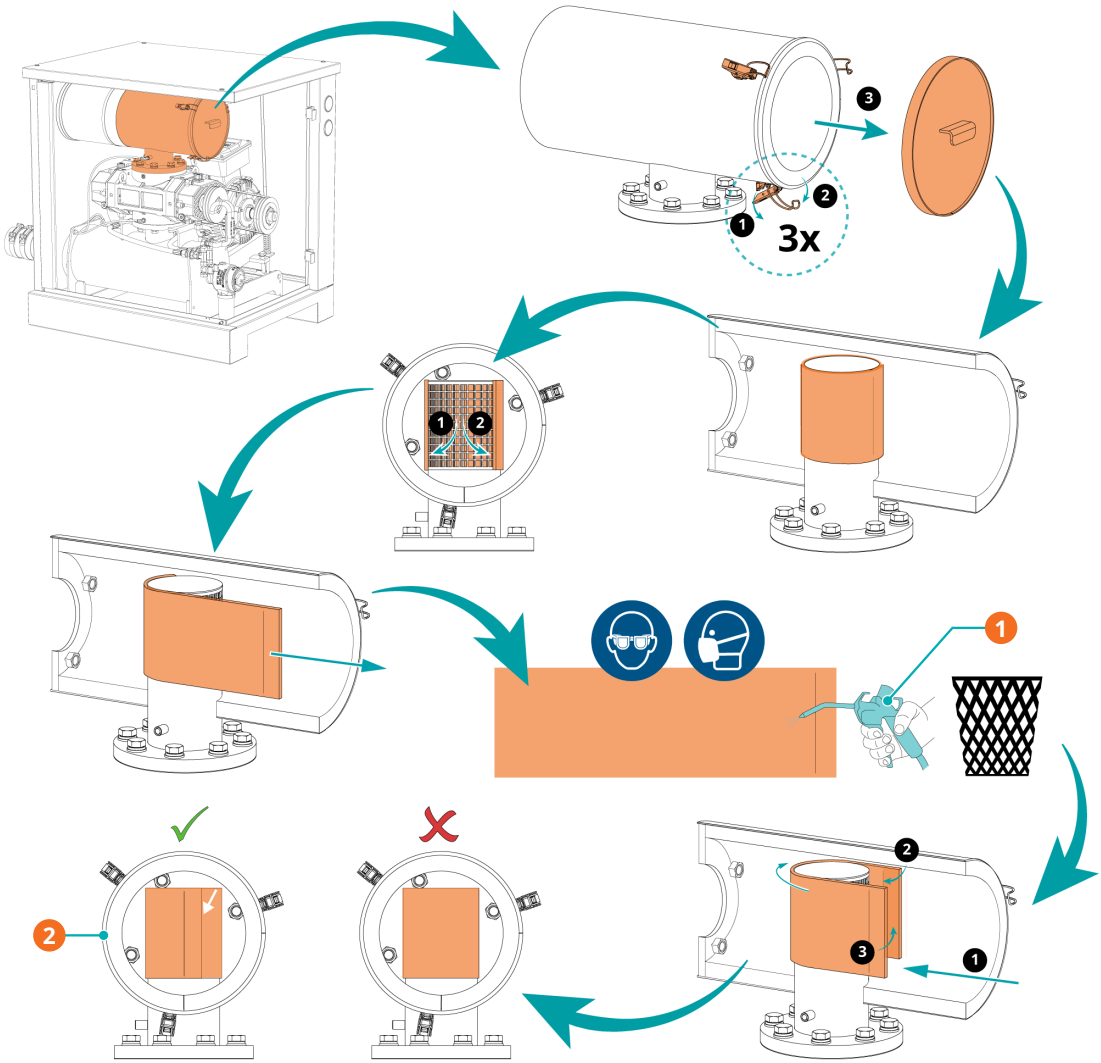
The inlet filter must be cleaned every month or sooner, depending on the application.

The filter must not be washed.

Cleaning with compressed air does not guarantee 100% cleanliness of the filter. It is therefore recommended to replace it with a new one.

Interval	Maintenance work
After 10 to 20 hours of operation	• Check the inlet filter and clean it if necessary, see *Cleaning or Replacing the Inlet Filter* [➔ 46].
Monthly (or more often, depending on application)	
Every 6 months	• Replace the inlet filter (or more often depending on application), see *Cleaning or Replacing the Inlet Filter* [➔ 46].
Yearly	

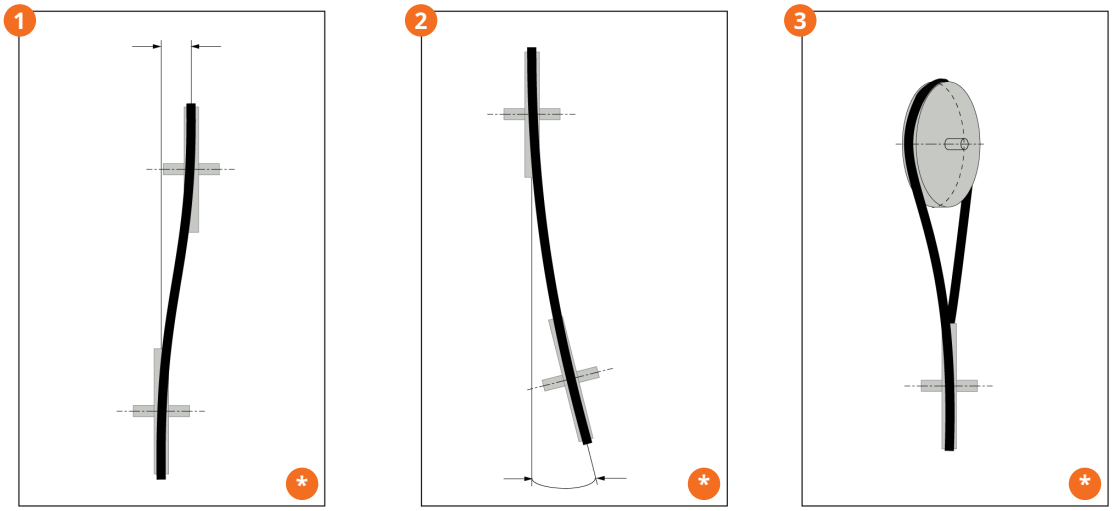
8.2.1 Cleaning or Replacing the Inlet Filter



Description			
1	Clean or replace	2	Make sure the filter is correctly positioned and put the cover back in place

8.3 Belt Maintenance and Pulley Alignment

Interval	Maintenance work
After 10 to 20 hours of operation	• Check the belt tension. Compare the actual value with the tension value specified in the shipping documentation. Tighten the belts if necessary. • Check the pulley alignments.
Every 6 months (or more often, depending on application)	• Check the belt tension. • Check the pulley alignments.
Yearly	• Replace the belts. • Belt change intervals for higher loads and ambient temperatures (over +40°C) range from 4000 to max. 8000 hours.



Description			
1	- Parallel offset: max. 1% of center distance for belts - Permissible parallel offset of two pulleys: 10 mm per 1000 mm of strand length	2	- Angular offset of two pulleys: max. 0.5° for belts - Permissible angular offset of two pulleys: 0.5°
3	- Axial twist of pulleys: max. 0.25° for belts - Permissible axial twist of pulleys: 0.25°	*	Product: Belts and multiple ribbed belts

8.4 Oil Maintenance

Interval	Maintenance work
After 10 to 20 hours of operation	• Check the oil level, see *Oil Level Inspection* [➔ 48].
Weekly	
After 500 hours of operation	• Change for a newly commissioned blower.
Every 8000 hours or minimum once a year	• Change the oil, see *Oil Change* [➔ 49].

8.5 Oil Level Inspection

WARNING

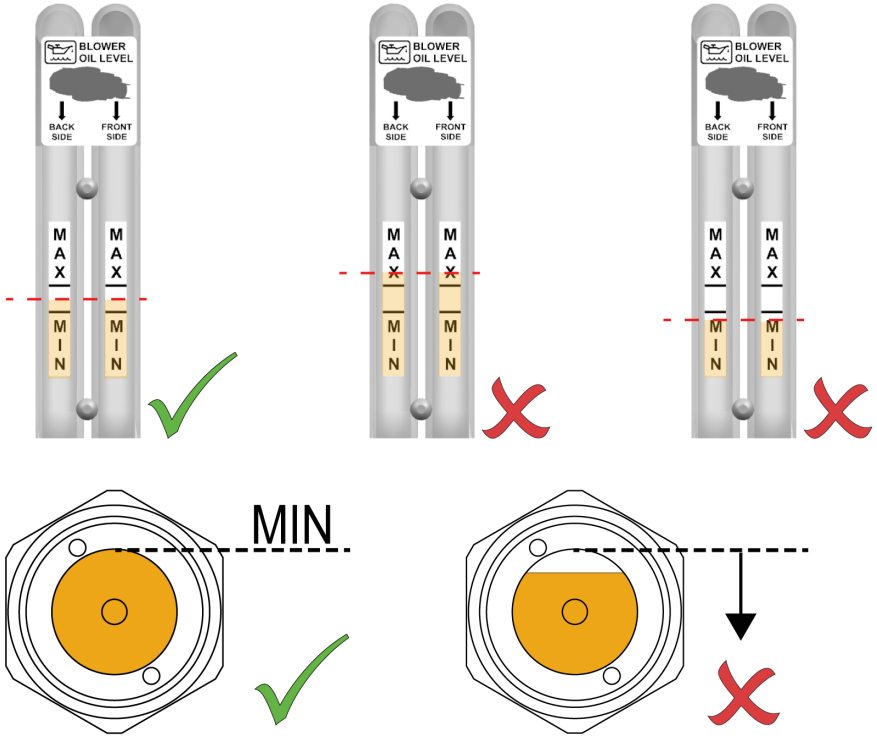
Oil overfilling.

Risk of increased operating temperature and increased absorbed power!

Risk of damage to the machine!

- Make sure to always fill the correct amount of oil.

- Stop the unit.
- Wait 1 minute.
- Check the oil level.



- Fill up if necessary, see *Filling Oil* [➔ 21].

8.6 Oil Change

NOTICE

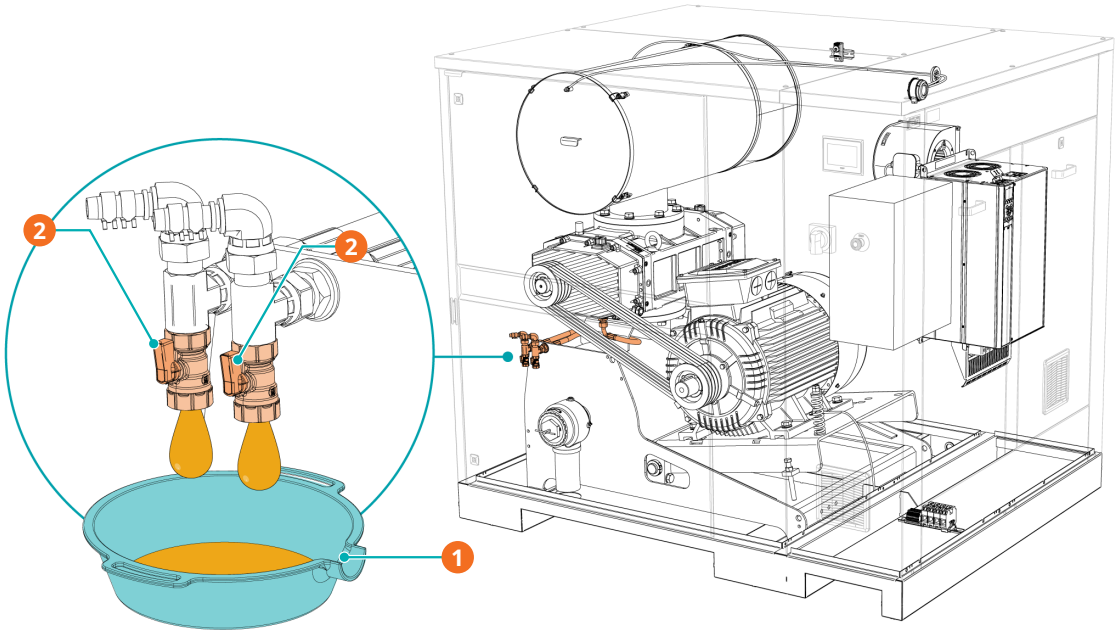
Use of inappropriate oil.

Risk of premature failure!

Loss of efficiency!

- Use only a type of oil previously approved and recommended by the manufacturer.
- Refer to the type of oil specified on the name plate of the machine.

- For more information about oil, see Oil chapter.



Description			
1	Use sufficiently large drain pans before opening the oil drain valves (ODV)	2	Open the oil drain valves (ODV)

WARNING

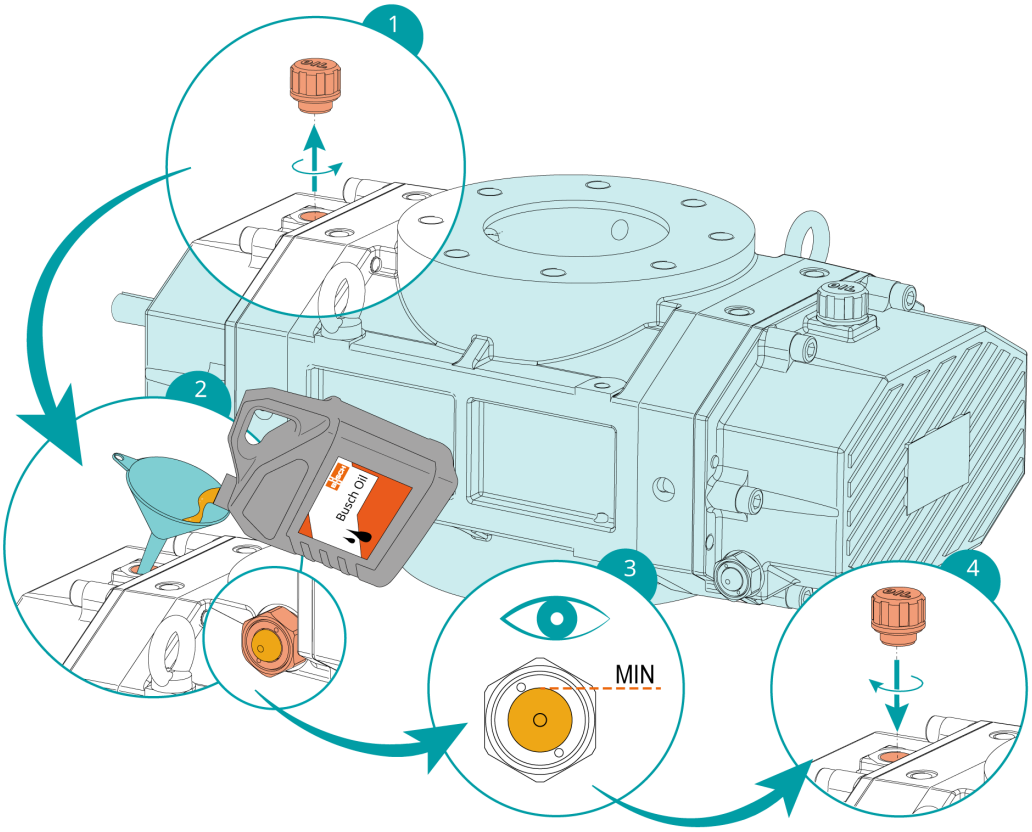
Oil overfilling.

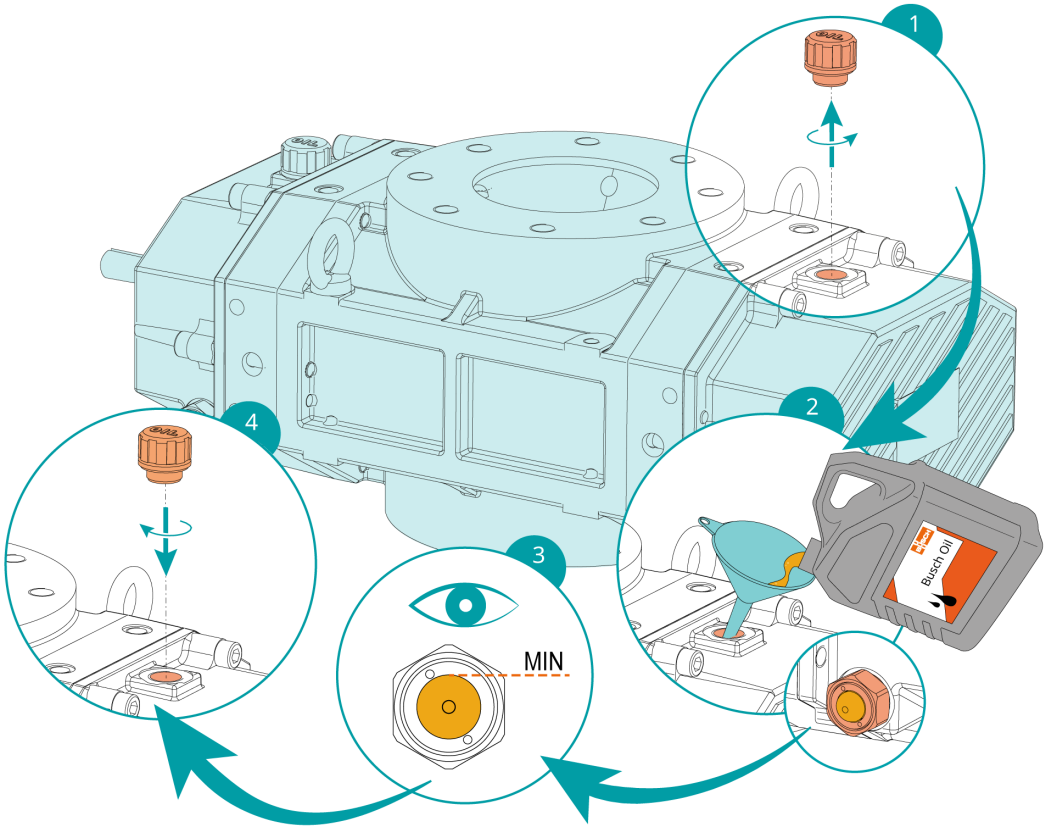
Risk of increased operating temperature and increased absorbed power!

Risk of damage to the machine!

- Make sure to always fill the correct amount of oil.

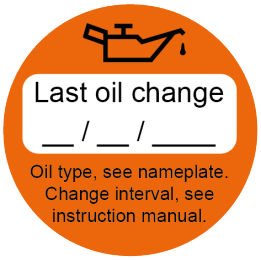
- For information on oil type and filling capacities, see the *Technical Data* [➔ 60] and *Oil* [➔ 61] chapters.


1
2
3
4
Busch Oil
MIN


1
2
3
4
Busch Oil
MIN

When oil filling is complete:

- Note the date of the oil change on the sticker.



If there is no sticker on the machine:

- Order it from your Busch representative (article number 0565 568 959).

9 Overhaul



WARNING



The unit is contaminated with hazardous material.

Risk of poisoning!

Risk of infection!

If the unit is contaminated with hazardous material:

- Wear appropriate personal protective equipment.

NOTICE

Incorrect assembly.

Risk of premature failure!

Loss of efficiency!

- Any disassembly of the unit beyond that described in this manual must be carried out by technicians approved by Busch.

If the unit has conveyed gas contaminated with foreign materials which are hazardous to health:

- Decontaminate the unit as much as possible and state the contamination status in a ‘Declaration of Contamination’.

The manufacturer will only accept unit accompanied by a signed, fully completed and legally binding "declaration of contamination", downloadable from the following link: *buschvacuum.com/declaration-of-contamination*.

10 Decommissioning



DANGER

Live wires.

Risk of electrical shock!

- Electrical installation work must only be executed by qualified personnel.



DANGER

Maintenance work without switching off the power supply to the control unit.

Risk of electrical shock!

- Switch off the power supply to the control unit with a lockable disconnect switch before attempting any work on it. High voltages are present at the terminals and within the variable speed drive for up to 10 minutes after disconnecting the electrical supply.
- Always ensure, by using a suitable two-pole voltage tester, that no voltage is present on any drive power terminals before starting any work.



CAUTION

Hot surface.

Risk of burns!

- Before doing anything that requires touching the unit, let it cool down first.



CAUTION

Hot liquids.

Risk of burns!

- Before draining liquids, let the unit cool down first.

- Stop the unit and lock it to prevent accidental start-up.
- Disconnect the power supply.
- Vent the connected lines to atmospheric pressure.
- Disconnect all connections.

If the unit is to be stored:

- See *Storage* [➔ 16].

10.1 Dismantling and Disposal

- Drain and collect the oil.
- Make sure that no oil drips onto the floor.
- Separate special waste from the unit.
- Dispose of special waste in compliance with applicable regulations.
- Dispose of the unit as scrap metal.

11 Spare Parts

NOTICE

Use of non-Busch genuine spare parts.

Risk of premature failure!

Loss of efficiency!

- Use only Busch genuine spare parts, consumables and supplies to ensure correct operation of the unit and to validate the warranty.

To order spare parts for basic maintenance:

- Contact your Busch representative and inform him of the serial number of your machine.

12 Troubleshooting



DANGER

Live wires.

Risk of electrical shock!

- Electrical installation work must only be executed by qualified personnel.



CAUTION

Hot surface during operation (up to over 70°C).

Risk of burns!

- Let the unit cool down first or wear heat-protection gloves.



CAUTION

Hot surface.

Risk of burns!

- Before doing anything that requires touching the unit, let it cool down first.



CAUTION

Hot liquids.

Risk of burns!

- Before draining liquids, let the unit cool down first.

Machine Troubleshooting Table

Problem	Possible Cause	Remedy
The blower is not running, and the blower shaft can be turned in both directions. The blower is not running, and the blower shaft cannot be turned manually.	Broken belts.	• Fit new belts.
	Motor failure.	• Repair and replace the motor (contact Busch).
	The lobes are in contact with the cylinder or the end covers.	• Check the blower for signs of overheating / overloading and carry out any necessary repairs. • Check the lobes for signs of corrosion and dissolve with oil.
	There are foreign bodies in the cylinder.	• Carry out any necessary repairs.
Abnormal sounds or vibrations. **STOP THE MACHINE IMMEDIATELY!**	The pulleys are in the wrong position. They are either parallel-displaced or angle-displaced.	• Place the pulleys correctly.
	Damaged bearings.	• Repair with bearing replacement.
	Lack of oil or dazed oil.	• Top up or change oil.
	Too much oil in oil box.	• Drain the oil and regulate the oil level.
	Unstable foundation.	• Ensure stable foundation.
	Resonance in pipe system.	• Pipe system must be connected to blower with flexible connections and supported if necessary.
	Differential pressure too high.	• Check for causes of increased differential pressure, e.g. blockage or damage. Check also for control system-based causes. Repair.
	Air leakage.	• Find the leakage spots and repair.
	The lobes are in contact with the cylinder or the end covers.	• Repair in workshop.
	There are foreign bodies in the cylinder.	• Repair in workshop.
	Damaged check valve.	• Replace check valve.

Problem	Possible Cause	Remedy
Abnormal heat development. **STOP THE MACHINE IMMEDIATELY!**	Abnormal increase in exhaust temperature.	• See causes marked with an asterisk (*).
	Rpm too low on blower (and/or motor with frequency regulation)	• Check the minimum allowed rpm. • Correct the rpm setting.
	Oil level too high.	• The oil level must be at the top of the level indicator when the blower is not running.
	Under-pressure in the machine room.	• Check the ventilation system and correct the ventilation amount or air lock sizes to avoid under-pressure in the room.
	Differential pressure too high. (*)	• Check, clean and replace the inlet filter. • Check pipes and process system (on both sides of the blower) for blockages, obstructions, both mechanical and control system related. • Repair the blower.
	Abnormal wear on the lobes after strain from solid media (e.g. dust from operation without inlet filter, CIP cleaning of the blower during operation with aggressive cleaning fluids or stress from aggressive gases).	• Install inlet filter to protect the blower
Oil leakage.	Oil level too high (above maximum on level indicator in cabinet)	• The oil level must be between MIN and MAX on level indicator on cabinet front.
	Leaking or damaged shaft seals.	• Repair in workshop.
	Blower has been tilted or is not mounted horizontally.	• Place on horizontal foundation.
	Differential pressure too high.	• Check, clean and replace the inlet filter. • Check pipes and process system (on both sides of the unit) for blockages, obstructions, both mechanical and control system related.

Problem	Possible Cause	Remedy
Loss of capacity.	Leak in the system.	• Find the leaks and fix them.
	Activated safety valve.	• Check differential pressure and see causes marked with an asterisk (*). Possibly set the safety valve opening pressure.
	Dirty inlet filter or blocked pipes.	• Clean and possibly replace filters and pipes.
	Loose belts.	• Replace belts.
	Differential pressure too high. (*)	• See symptoms and causes marked with an asterisk (*).
Continuously activated safety valve.	Rpm too high and thereby too high amount of air (concerns VSD controlled blowers).	• Reduce the rpm.
	Differential pressure too high. (*)	• Find the cause of the increased differential pressure and fix it.
	The valve setting is below the actual operating point.	• Adjust the maximum limits of the valve within the blower. • Monitor the absorbed power and make sure that the setting does not allow any overloading of the unit.
Abnormally high differential pressure. (*) **STOP THE MACHINE IMMEDIATELY!**	Safety valves do not open despite too high differential pressure.	• Disassemble and clean the valve. Possibly readjust.
	Blockages on inlet side or outlet side of the blower.	• Clean the pipe system, and check for mechanical or control system related blockages or obstructions, that can lead to an increased loss of pressure.
	Fault on check valve.	• Replace check valve.
The motor is rotating in the wrong direction.	Wrong power supply.	• Switch two phases to reverse the direction of rotation.
Abnormal motor temperature.	Defective motor or motor bearings.	• Repair and replace the motor.
	The motor is not wired correctly.	• Check and wire correctly.
	Overloading.	• Check for causes of increased differential pressure in the system and fix them.
	Wrong power supply.	• The power supply must comply with the motor name plate data.
	Ambient temperature too high (+40°C).	• Improve ventilation in the machine room.
	Defective motor fan.	• Replace the motor fan.

HMI Troubleshooting Table

Problem	Possible Cause	Remedy
The blower is not running.	Alarm trip of the monitoring sensors or the variable speed drive.	• Let the machine cool down. • Check the Event log on the Touch Screen.
Alarm buzzer is on.	Alarm from monitoring sensors or electric drive.	• Check details of the alarm on the HMI Touch Screen (folder “Event” and “Info”, click on the highlighted alarm for more details).
Warning Filter clogged (DI29).	Filter is clogged or cable disconnection.	• Check the filter first. Clean or replace it if necessary. • If the filter is ok, check the sensor cable connection.
Warning Stop pressure (security).	Pressure is higher than the permitted limit.	• Check that speed/pressure target are correct. • Also check if the unit outlet is correctly connected.
Warning Live 0 err, cable break (W2).	Pressure sensor disconnected.	• Check the pressure sensor cable connection.
	NOTE: If the problem persists and you do not want to operate the unit without pressure control, you can activate the “Pressure sensor disconnected” option “Stop in case of alarm”.	
Alarm Live 0 err, cable break (A2).	Pressure sensor disconnected.	• Check the pressure sensor cable connection.
	NOTE: If the problem persists and you are authorized to operate the unit without pressure control, you can deactivate the “Pressure sensor disconnected” option “Stop in case of alarm”.	
Warning OTTO COM loss (if OTTO installed).	The OTTO IoT Box is not communicating with the HMI.	• Check the cable connection. • Switch OFF-ON the unit.
Warning VSD COM loss.	The VSD is not communicating with the HMI.	• Check the cable connection. • Switch OFF-ON the unit.
Warning [Auto on] button.	The VSD is not in “Auto Mode” (the start command is not considered).	• Click on the “Auto On” button in the VSD control panel.
Alarm Emergency STOP (A68).	The emergency stop has been activated.	• Clarify the reason for the emergency. • Solve the problem and follow the Warning/Alarm Acknowledgment procedure.
Alarm Modbus timeout.	The Modbus Master is not communicating with the HMI according to the delay time "wTimeoutCmdModbusSlave" defined in the Modbus Table (Register n°2).	• Check the ethernet cable connection between the Master and the HMI. • Try to carry out communication between the Master and the HMI according to the delay time or set the timer to 0 if the communication is not cyclic.

Problem	Possible Cause	Remedy
Alarm Security chain (DI32).	Current protection 3F4, ventilator contactor 6KM5 or Circuit breaker 3Q4 have tripped.	• Check all item status. • Check all cable connections. • Switch OFF-ON the unit.
Alarm Over temperature (DI19).	Unit temperature sensor has tripped.	• Check the cable connection. • Let the unit cool down. • Switch OFF-ON the unit.

For resolution of problems not listed in the troubleshooting table, contact your Busch representative.

13 Technical Data

		WT 0600 CV PLUS	WT 0600 CP PLUS
Volume flow (50 Hz)	m^3/h	900 – 3100	
Nominal motor rating (50 Hz) *	kW	18.5 – 55.0	30.0 – 90.0
Max. differential pressure	hPa (mbar)	-500	+800
Blower speed (50 Hz)	min^{-1}	1000 – 3500	
Maximum intensity	A	*	
Circuit breaker (MCCB) *		SCCR 25kA 400V	
Ambient temperature	°C	0 ... 45	
Maximum allowable air inlet temperature	°C	45	
Relative humidity	at 30°C	90 %	
Dimensions (L x W x H) with cabinet	mm	1900 x 1570 x 1732	
Weight blower stage approx.	kg	352	
Weight approx. with cabinet	kg	1820	1780

* Refer to additional tables below

WT 0600 CP PLUS							
Nominal motor rating	kW	30	37	45	55	75	90
Maximum intensity	A	55	70	80	100	130	150
Circuit breaker (MCCB)	SCCR 25kA 400V	C-63	C-80	C-100	C-125	C-160	C-200

WT 0600 CV PLUS							
Nominal motor rating	kW	18.5	22	30	37	45	55
Maximum intensity	A	37	43	55	70	80	100
Circuit breaker (MCCB)	SCCR 25kA 400V	C-40	C-50	C-63	C-80	C-100	C-125

		WT 0730 CV PLUS	WT 0730 CP PLUS
Volume flow (50 Hz)	m^3/h	1200 – 4000	
Nominal motor rating (50 Hz) *	kW	30.0 – 75.0	37.0 – 90.0
Max. differential pressure	hPa (mbar)	-500	+600
Blower speed (50 Hz)	min^{-1}	1000 – 3500	
Maximum intensity	A	*	
Circuit breaker (MCCB) *		SCCR 25kA 400V	
Ambient temperature	°C	0 ... 45	
Maximum allowable air inlet temperature	°C	45	
Relative humidity	at 30°C	90 %	
Dimensions (L x W x H) with cabinet	mm	1900 x 1570 x 1732	
Weight blower stage approx.	kg	400	
Weight approx. with cabinet	kg	1916	1876

* Refer to additional tables below

WT 0730 CP PLUS						
Nominal motor rating	kW	37	45	55	75	90
Maximum intensity	A	70	80	100	130	150
Circuit breaker (MCCB)	SCCR 25kA 400V	C-80	C-100	C-125	C-160	C-200

WT 0730 CV PLUS						
Nominal motor rating	kW	30	37	45	55	75
Maximum intensity	A	55	70	80	100	130
Circuit breaker (MCCB)	SCCR 25kA 400V	C-63	C-80	C-100	C-125	C-160

14 Oil

Name	ISO-VG	Oil type	1 L packing	5 L packing	10 L packing	20 L packing
ANDEROL 6220	220	Synthetic	0831 300 009	0831 300 011	-	0831 300 012
VS 220	220	Synthetic	0831 217 852	0831 217 853	-	0831 217 855

	WT 0600-0730 CP/CV PLUS
Oil capacity - Motor side	1.1 l
Oil capacity - Gear side	1.1 l

To find out which oil needs to be filled into the unit, refer to the name plate (NP).

Oil suitability

- **Oil VS 220**: Suitable for standard applications.
- **Anderol 6220:** Food grade gear oil

15 EU Declaration of Conformity

This Declaration of Conformity and the CE-markings affixed to the name plate are valid for the unit within the Busch scope of delivery. This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

When this unit is integrated into a superordinate machinery, the manufacturer of the superordinate machinery (this can be the operating company, too) must conduct the conformity assessment process for the superordinate machine or plant, issue the Declaration of Conformity for it and affix the CE-marking.

The manufacturer

Busch Výroba CZ s.r.o.
Svárovská 620
CZ 460 01, Liberec 11

declares that the unit: rotary lobe blower package for overpressure or vacuum operation TYR WT 0600-0730 CP / CV PLUS

fulfill(s) all the relevant provisions from EU directives or regulations:

- 'Machinery Directive' 2006/42/EC, if the serial number is less than or equal to CZM127029999 (until January 19, 2027).
- 'Machinery Regulation' (EU) 2023/1230, if the serial number is greater than or equal to CZM127030000 (from January 20, 2027). The conformity assessment has been carried out according to internal production control procedure (Module A), in accordance with the requirements of the 'Machinery Regulation'.
- 'Electromagnetic Compatibility' (EMC) 2014/30/EU
- 'RoHS' 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (incl. all related applicable amendments)
- 'Cyber Resilience Act' [1)], Regulation (EU) 2024/2847, if the serial number is greater than or equal to CZM127480000 (from December 11, 2027). The conformity assessment has been carried out according to internal production control procedure (Module A), in accordance with the requirements of the 'Cyber Resilience Act'.
- 'Low Voltage Directive (LVD)' 2014/35/EU

and comply(-ies) with the following harmonized standards, common specifications or other technical specifications:

Standard	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN IEC 63000 : 2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN IEC 61000-6-2 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Immunity for industrial environments
EN IEC 61000-6-4 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments
EN IEC 62443-3-3 : 2019	Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels

Legal person authorized to compile the technical file and authorized representative in the EU (if the manufacturer is not located in the EU):
Busch Dienste GmbH, Schauinslandstr. 1, DE-79689 Maulburg

Liberec, 2026.10.01



Michael Dostalek, General Manager

Busch Výroba CZ s.r.o.

[1)] The **'Cyber Resilience Act'** regulation is applicable if the unit is delivered ex-factory with digital elements containing programmable or digital functions, such as a control box, a VSD (Variable Speed Drive), an OTTO IoT Box, a Busch PLC (Programmable Logic Controller) ...

16 UK Declaration of Conformity

This Declaration of Conformity and the UKCA-markings affixed to the name plate are valid for the unit within the Busch scope of delivery. This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

When this unit is integrated into a superordinate machinery, the manufacturer of the superordinate machinery (this can be the operating company, too) must conduct the conformity assessment process for the superordinate machine or plant, issue the Declaration of Conformity for it and affix the UKCA-marking.

The manufacturer

Busch Výroba CZ s.r.o.
Svárovská 620
CZ 460 01, Liberec 11

declares that the unit: rotary lobe blower package for overpressure or vacuum operation TYR WT 0600-0730 CP / CV PLUS

fulfill(s) all the relevant provisions from UK legislations:

- Supply of Machinery (Safety) Regulations 2008
- Electromagnetic Compatibility Regulations 2016
- Restriction of the use of certain hazardous substances in Electrical and Electronic Equipment Regulations 2012

and comply(-ies) with the following designated standards, common specifications or other technical specifications:

Standard	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN IEC 63000 : 2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN IEC 61000-6-2 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Immunity for industrial environments
EN IEC 61000-6-4 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments
EN IEC 62443-3-3 : 2019	Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels

Legal person authorized to compile the technical file and importer in the UK (if the manufacturer is not located in the UK):
Busch (UK) Ltd, 30 Hortonwood, Telford – UK

Liberec, 2026.10.01



Michael Dostalek, General Manager

Busch Výroba CZ s.r.o.

BUSCH GROUP

The Busch Group is one of the world's largest manufacturers of vacuum pumps, vacuum systems, blowers, compressors and gas abatement systems. Under its umbrella, the group houses two well-known brands: Busch Vacuum Solutions and Pfeiffer Vacuum+Fab Solutions. Together, they offer solutions to a wide range of industries. A global network of highly competent local teams in 44 countries ensures that expert, tailor-made support is always available near you. Wherever you are. Whatever your business.



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